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FOREIGN AGRICULTURE REPORT

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THE MEXICAN WINTER-VEGETABLE EXPORT INDUSTRY

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by

MERVIN G. SMITH

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THE MEXICAN WINTER-VEGETABLE EXPORT INDUSTRY

Mexico has exported winter vegetables to the United States for over 35 years. During the recent war years Mexico has become the most important foreign source of tomatoes for the United States, and in the winter months its shipments have nearly equaled the supply from United States winter producing areas. The peak of Mexican exports was reached in 1945, when about 227,557,000 pounds of tomatoes, 21,109,000 pounds of peppers, and 9,925,000 pounds of fresh peas were exported (table 11). During the war, Mexico has been a favored area for the production of these vegetables in that labor was available and there was an expanding market outlet in the United States and Canada. In contrast, production in Cuba, one of Mexico's most important competitors in the United States vegetable market, was forced down sharply by the shortage of shipping. In 1942, tomatoes occupied about the ninth place in value of crops produced in Mexico, the farm value being about $6,725,000 (U. S. currency). From 1942 to 1945 about half the tomatoes produced in Mexico were exported, all going to the United States and Canada.

HISTORY

Some of the winter vegetables produced in Mexico, especially tomatoes and peppers, seem to have originated in South and Central America. They are crops that require many days for maturing; therefore they naturally grow well in Central and South America, where the growing seasons are long. Both tomatoes and peppers are found growing wild in Mexico, but it is doubtful whether they are native to the country. Those at present growing wild probably escaped from cultivated plots. Original wild species are thought, however, to be growing in South America.

The production of tomatoes as an important commercial export industry in Mexico was started during the early part of this century. The industry was on a small scale, however, until the Southern Pacific Railroad of Mexico was constructed on the western coast of the mainland. Prior to 1905, tomatoes were shipped to Los Angeles and San Francisco from some of the ports along the west coast, such as Mazatlán, but they met with poor success, since the steamers were slow and not equipped with refrigeration facilities. Shipping by express was started between 1905 and 1908, when the construction of the railroad was extended southward. The first shipment, made early in the spring of 1908 from Los Mochis, one of the larger producing areas in Sinaloa, consisted of 500 crates and, according to reports, netted the growers about 80 cents per crate. Carlot shipments were probably first made the following year from Bacum in the Yaqui River Valley and Los Mochis in the Fuerte River Valley.

The earliest records available of carlot shipments of vegetables from Mexico to the United States are those kept by the Traffic Department of the Southern Pacific Railway Company of Mexico. Although these statistics begin with 1912, some carlot shipments were made 2 to 3 years earlier. During the revolutionary period in Mexico exports were at a low ebb.

Mervin G. Smith was assistant agricultural attaché in Mexico City during the war years and wrote this report during that time. The report was sent to Washington in 1944 where it was prepared for publication in the Division of Fruits, Vegetables and Sugar, Office of Foreign Agricultural Relations. Ruth G. Tucker checked the statistical tables, and Wilbur H. Youngman reviewed the manuscript.

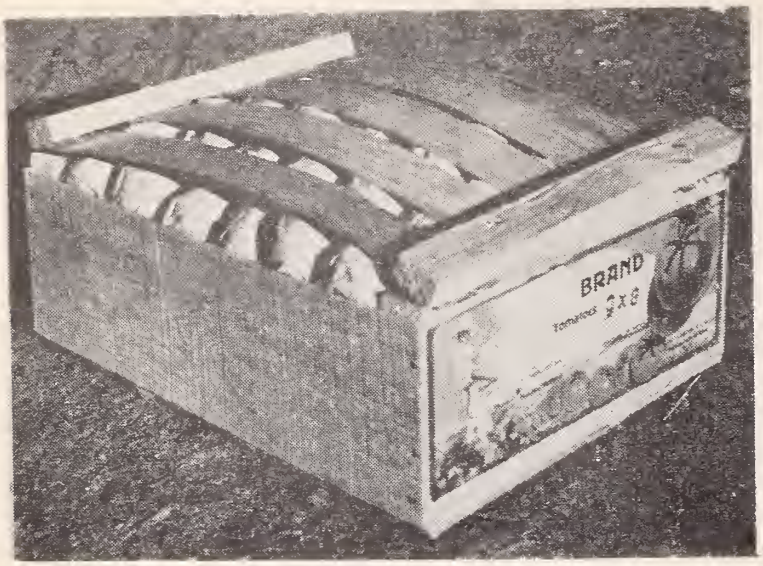

FIGURE 1. — A lug of Mexican tomatoes to be sold in the United States. Note that each tomato is wrapped and arranged neatly in the container.

After that period, with more stable political conditions prevailing in Mexico, production increased rapidly and reached a peak in 1930, when about 8,350 cars of vegetables were exported. In 1933 shipments dropped abruptly and, during the depression years, stayed at relatively low or moderate levels. Beginning in 1941 shipments increased again and reached a new peak of about 9,000 cars in 1945. Even though the acreage of vegetables was larger in 1944 than in any other year, unfavorable weather conditions early in the season reduced production, and exports of all vegetables from the west coast totaled only about 7,600 cars (table 1).

TABLE 1. — *Carlot shipments of vegetables from the west coast of Mexico, 1912-46*

YEAR[1]	CARS	YEAR[1]	CARS
	Number		*Number*
1912	441	1929	6,104
1913	195	1930	8,350
1914	0	1931	6,089
1915	79	1932	6,025
1916	91	1933	2,324
1917	143	1934	1,201
1918	486	1935	2,737
[illegible]	666	1936	2,798
1920	864	1937	4,174
1921	1,003	1938	2,335
1922	1,415	1939	1,613
1923	2,198	1940	1,808
1924	2,694	1941	5,161
1925	3,507	1942	6,602
1926	4,414	1943	8,810
1927	6,337	1944	7,566
1928	6,017	1945	9,156
		1946	6,990

[1] November-April marketing season ending in years shown; that is, 1946 refers to the 1945-46 season.

Traffic Department of the Southern Pacific Railway Company of Mexico.

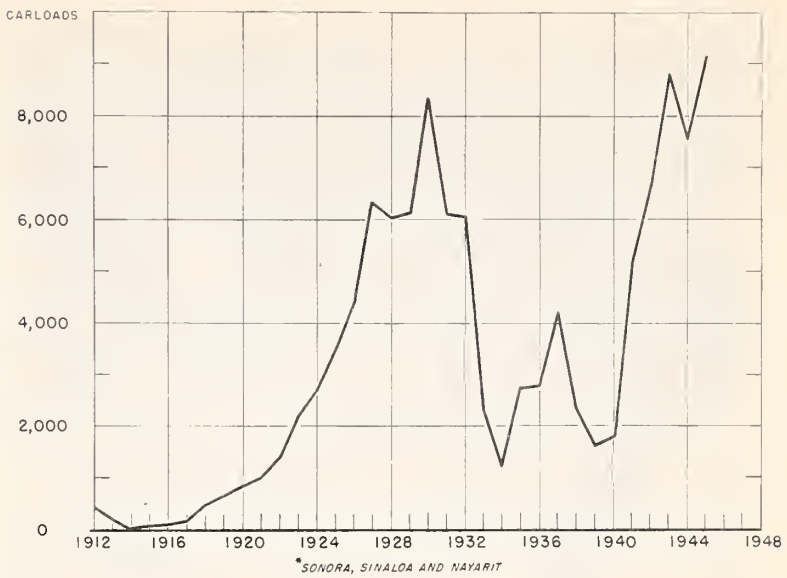

FIGURE 2. — Carload shipments of winter vegetables from the west coast of Mexico, 1912-45.

A number of factors caused the slowing up of the industry during the 1930's. One of these was the general depression in the United States, which resulted in a decreased demand for Mexican vegetables. No small factor, however, was the increased expropriation of lands in Mexico under the Agrarian Laws originally established about 1915. This discouraged the larger landholders from developing their property on a large scale and even tended to drive some United States citizens from their operations in Mexico. Also, the increase in the United States tariff rate on tomatoes to 3 cents per pound in 1930 probably had an adverse effect on Mexican production during the decade. Larger returns and somewhat more stable conditions during recent years, on the other hand, have given encouragement to vegetable producers.

The west-coast areas which produce winter vegetables have contributed the greater part of the vegetables exported from Mexico. Statistics covering exports from all parts of the country must be considered, however, in order to include minor areas of production and such minor export crops as onions, garlic, cantaloups, and watermelons. A relatively new tomato-producing area in the southern part of the State of Tamaulipas began in 1942-43 to export significant quantities of tomatoes, which are the most important of the winter vegetables grown in Mexico and account for from two-thirds to three-fourths of all the vegetable exports.

While the production of tomatoes was developed first, soon growers planted other crops and started exporting them, probably sometime around 1918. Many native landowners were attracted to the growing of such vegetables as green corn, string beans, peppers, okra, peas, cucumbers, cantaloups, eggplant, etc., as well as of tomatoes, and several millions of dollars of United States capital, principally from California, were invested. For example, in the crop season 1921-22 a total of about 1,250 cars was exported. Of this number, 1,113 cars were of tomatoes, 33 of peppers, 65 of cantaloups, and 39 of other vegetables. Officials of the Southern Pacific Railroad of Mexico estimated[1] the tomato acreage on the west coast at 17,243 acres in 1922-23. This was the first season that green peas were planted to any extent. The acreage of green peas was reported at about 2,320 acres, the acreage of cantaloups was placed at 1,287 acres, and that of mixed vegetables at 1,559 acres. Thus, the acreage of vegetables on the west coast that season totaled about 22,409 acres.

[1] Report by United States Consul W. E. Chapman of Mazatlán, Sinaloa, January 18, 1923.

FIGURE 3. — A basket of Mexican peas to be shipped to the United States. Note the uniformly large pods. About 650,000 of these baskets of peas were exported to the United States in 1943. These appear on the markets of the United States from December to April each year.

Many other vegetables have been tried on the west coast and produced in small quantities for export. The production of some has never been large, and production of others has been discontinued. Peas and chili peppers have nearly always been produced in more or less equal quantities, but they are much less important than tomatoes. A small amount of eggplant, varying from 165 to 385 tons, has been exported nearly every year during the past 10 years. String beans for export were produced in small quantities on the west coast until 1943-44. The previous year, 1942-43, the bean-pod borer was found in string beans, and, when the United States Bureau of Entomology and Plant Quarantine finds such insects, the shipments are rejected. For that reason producers at present are reluctant to take the chance of growing relatively large quantities of string beans for export. Practically no cucumbers, okra, or green corn have been produced in recent years. A few carloads of cantaloups, however, have been exported nearly every year.

Exports of garlic during the past 10 years have varied from about 500 to 4,400 short tons. Onions were not grown for export until the past 3 or 4 years, when production was increased as a result of strong demand in the United States. Cantaloups and watermelons have never been exported in large quantities from any area in Mexico, but, during the past few years, exports have been in greater volume.

DESCRIPTION OF REGIONS OF PRODUCTION

Vegetables are produced in many parts of Mexico, but, as this report is primarily concerned with the export phase of the industry, the discussion is confined to areas which produce vegetables for shipment. These areas are found mostly in the valleys, especially near rivers where irrigation water is available. The statistics of acreage, yield, and production of the nine crops discussed in this report for all Mexico, by States, are for the latest year available. (See appendix tables 1 to 9.) The regions producing for export are indicated in figure 4.

A large proportion of the export vegetable crops are now produced in the States of Sinaloa and Sonora, the exceptions being garlic and onions. The new region for tomato production, in the southern part of the State of Tamaulipas, may become relatively more important for the production of other kinds of export vegetables. It is sometimes referred to as the El Mante area, although only about one-half the tomatoes are produced near the town of El Mante. The remainder are grown near the towns or stations of Ciudad Victoria, Adelaide, Alvaro Obregón, Manuel, and Cuauhtemoc.

There are two main areas for the commercial production of onions for export: One is in the central part of the country in the States of Guanajuato and Jalisco, usually called the Ocotlán area; the other major area is west of Tampico in the State of Tamaulipas. This latter area only became important in the last few years. Some exports are also made from the States of Puebla and Morelos. The production of garlic is also widely distributed, but the larger commercial areas are not so well defined as those producing onions.

Part of the small quantity of string beans exported comes from Lower California and passes through the port at Tijuana. Nearly all eggplant exports, as well as those of peas, come from the States of Sonora and Sinaloa. Exports of cantaloups have been originating in small volume from a number of places in Mexico, but they come mostly from the west coast in the States of Sonora and Sinaloa and from the Mexican side of the Rio Grande Valley. The areas of production of all vegetables for export are indicated to some extent in table 20, which gives the export points for peas, eggplant, string beans, onions, garlic, cantaloups, and watermelons.

Climate, Rainfall, and Temperature

Many different climatic combinations are found in Mexico, and some vegetables are harvested every day of the year. In the States of Sinaloa and Sonora, the largest region of production, the cultivated areas, which are frequently only a few feet above sea level, are located mainly in the river valleys which extend from the Sierra Madre Occidental Mountains down to the Gulf of California. Nearly all the rainfall occurs in the summer and early fall months. Therefore, even though most areas receive from 15 to 25 inches of rain annually, some form of irrigation is needed in order to produce crops during the dry season when many of the rivers dry up. No water is then available for irrigation unless dams have been built to store up the water during the rainy season, or wells have been dug.

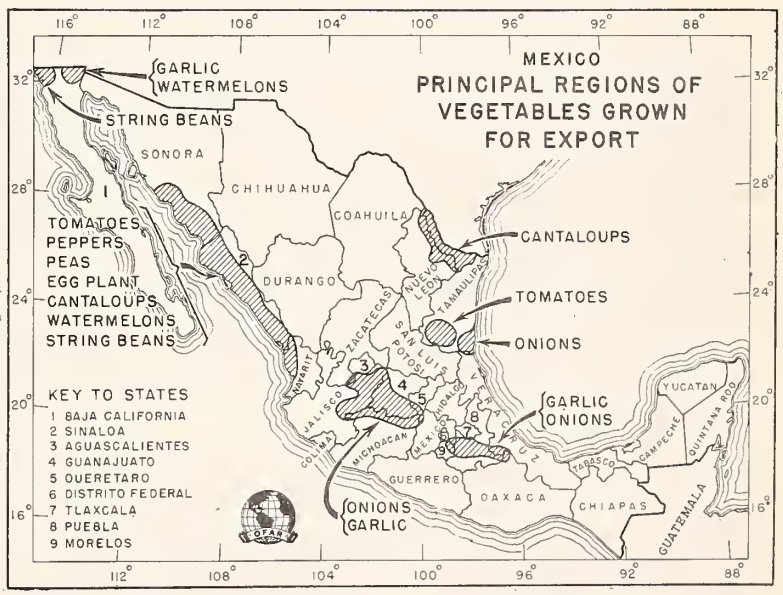

FIGURE 4. — Map of Mexico showing the regions which produce the most important part of the vegetables for export.

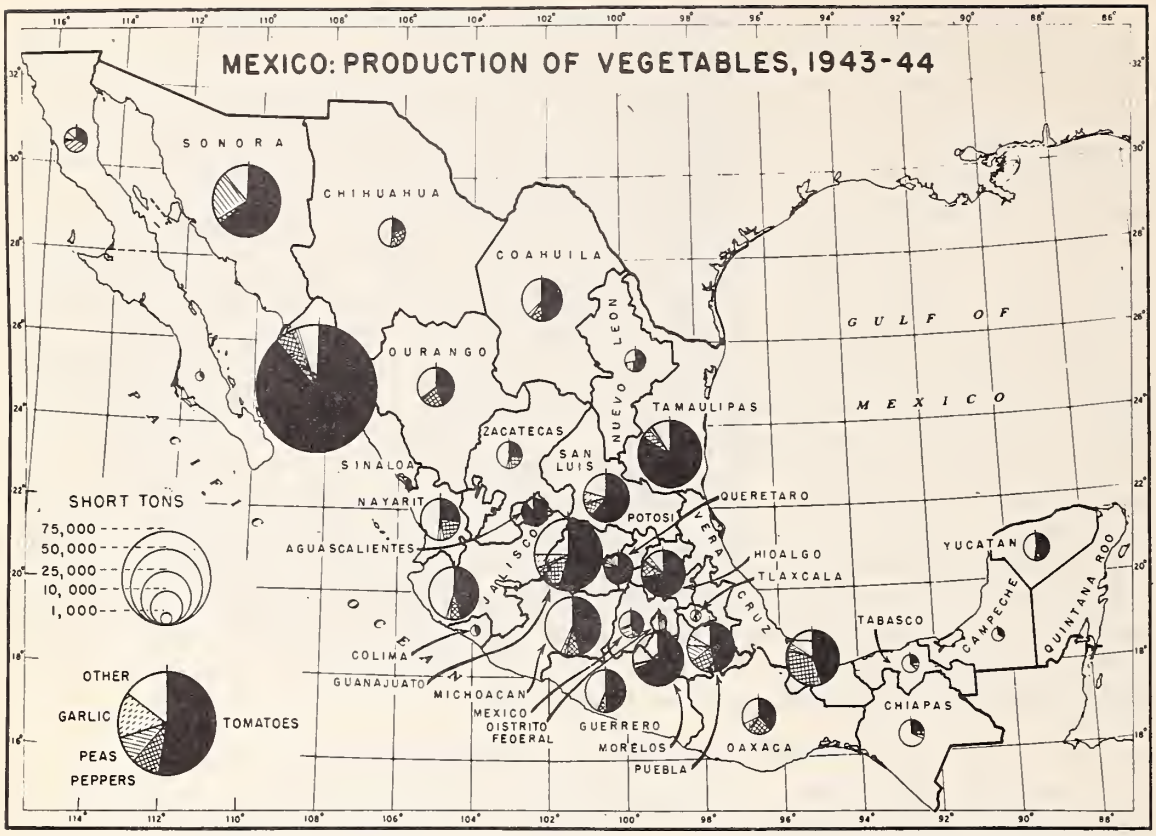

FIGURE 5. — The west coast States of Mexico lead in the production of vegetables, particularly of tomatoes.

Nearly all the areas producing vegetables for export are at low elevations, except those in the central part of the country, which produce onions and garlic. In the States of Jalisco and Guanajuato, the most important region for these crops, the elevation is between 5,000 and 6,000 feet. A smaller region in the States of Puebla and Morelos also has an altitude of between 4,000 and 6,000 feet.

Rainfall is probably heaviest in the El Mante and Tampico areas, where tomatoes and onions are grown. In these areas the rainfall is usually from 30 to 45 inches per year, but wide variations occur and sometimes droughts. In the central areas, it averages between 25 and 30 inches per year. In most of the areas along the border the rainfall is only about 10 or 15 inches per year. Regardless of the amount of precipitation in any one area, nearly all the vegetable production is dependent upon some irrigation.

In the main area of production on the west coast, the annual temperature usually averages about 75° to 80° Fahrenheit, with the maximum about 110° and the minimum about 40°. During the fall and winter months, when vegetables are produced, the average is from 65° to 70°. The highest temperatures prevail in the late-spring and early summer months, when it is considered too hot for vegetables to grow well. Frosts are rare in all these river valleys, but in some other valleys outside the main producing area, such as the Mayo Valley of southern Sonora, there are occasional frosts. The occurrence of these frosts makes vegetable production hazardous and in

some years causes considerable losses. Harvests are late, and prices are likely to be less favorable.

Temperatures in the tomato-producing area in Tamaulipas average about the same as those on the west coast, but the range is somewhat greater, being from about 35° to 115° F. Severe frosts occurred in 1944, but producers in these areas said they were unusual and had occurred previously only once every 10 or 15 years. The average temperature, about 65°, in the higher areas of the central part of the country is lower than in the other producing areas. During 2 or 3 months of the year, from November to February, frosts occur in these areas quite often. Onion and garlic plants, however, are better able to withstand cooler weather than some of the other vegetables. Also, they usually mature before the severer frosts come, and light frosts occurring during the harvest period seldom do much damage to the onion and garlic crops. The producing areas along the border are considered to be among the hottest in Mexico, but vegetables are grown during the cooler part of the year.

Altogether, in Mexico rainfall, temperature, and especially frosts, are very influential factors in the production of vegetables for export. In some cases, the vegetables cannot be seeded or set earlier because of the frosts and severe rains that might wash them out. Also, in some areas, frosts may occur at almost any time during the year and completely, or partly, destroy the crops, or at least retard them.

Soils

The soils in the river valleys in the main producing region on the west coast are practically all alluvial. They consist mainly of riverwash from the mountains. The lowlands are virtually tidal plains consisting of fine silts, sands, and heavy adobe or clay. As a result of erosion, the soils in the slightly higher elevations, or to the east - gravel, sand, and silt - are coarse in texture. The rivers have undoubtedly changed their courses many times; thus, they have left large deposits in certain places and in others have washed away the soil. There is little humus (decayed vegetable matter) in these soils, except in the low places, and, there is much more organic matter in some of the valleys than in others. For instance, the Mayo Valley and the Río del Fuerte Valley near Los Mochis have more humus than many of the others. Much of the land has maintained bush and shrub growth for a number of years and was not farmed to any extent until irrigation was made available. When first cleared and cultivated, this new land is fertile and quite productive for most crops.

The great groups of soils found in the United States just north of the border extend down into Mexico. On the west coast, in the States of Sonora and Sinaloa, are semidesert soils and Sierozems, which extend down into the northern coastal areas of the State of Sinaloa. Just behind this area, in the northern part of Sinaloa and further inland, is the Brown soil, which continues southward until it reaches the coast in the central part of the State. The soil around the city of Culiacán is probably of this group. Further inland and back of this area are the Chernozems. This group covers the inner part of the State of Sinaloa in the north and extends to the coast near Mazatlán and on down into Nayarit. In fact, most of the central part of the country has Brown and Chernozem soils. In the areas of southern Tamaulipas where tomatoes and onions are grown, the soils are mostly of the Rendzina group.

In the central part of the country (Ocotlán area), where onions and garlic are principally produced, the soils vary from fine sand and silt loam to an adobe clay. Most of them are lacking in humus, unless they have recently been brought into

TABLE 2. – *Analyses of soils from some of the regions of Mexico producing vegetables and truck crops, 1944*

From:	Los Mochis, Sinaloa. (Del Fuerte River Valley - West Coast)
Sample:	No. 1
Date Collected:	May 8, 1944
Date Analyzed:	July 5, 1944
Analyzed by:	Drug and Related Products Mission, Foreign Economic Administration, Mexico, D. F.

ITEM:	RESULTS:	INDICATION:[1]
pH	7.8	Slightly too alkaline
Aluminum	low	Not harmful
Nitrite nitrogen	1 p. p. mill.	Not harmful
Sulfates	50 p. p. mill.	Presumably adequate
Ferric iron	low	Suitable
Manganese	low	Presumably adequate
Magnesium	low	Presumably adequate
Calcium (replaceable)	1,000 p. p. mill.	Adequate
Ammonia nitrogen	low	Suitable
Chlorides	25 p. p. mill.	Not harmful
Nitrate nitrogen	16 p. p. mill.	Totally inadequate - needs nitrogen fertilizer
Phosphorus	150 lbs./acre	Borderline - probably would respond well to phosphate fertilizer
Potassium	400 lbs./acre	Presumably adequate

From:	Culiacán, Sinaloa. (Culiacán River Valley - West Coast)
Sample:	No. 1 (Surface)
Date Analyzed:	June 2, 1944
Analyzed by:	Drug and Related Produots Mission, Foreign Economic Administration, Mexico, D. F.

ITEM:	RESULTS:	INDICATION:[1]
pH	8.1	Slightly too alkaline
Aluminum	medium	Not harmful
Nitrite nitrogen	small parts	Not harmful
Sulfates	none	Inadequate
Ferric iron	very low	Suitable
Manganese	medium low	Presumably adequate
Magnesium	medium	Not harmful
Calcium (replaceable)	5,000 p. p. mill.	High, but probably not harmful
Ammonia nitrogen	low	Suitable
Chlorides	none	Suitable
Nitrate nitrogen	40 p. p. mill.	Borderline - probably would respond well to nitrogen fertilizer
Phosphorus	150 lbs./acre	Borderline - probably would respond well to phosphate fertilizer
Potassium	350 lbs./acre	Presumably adequate

From:	Valle de Santiago, Guanajuato. (Central area for Onions and Garlic)
Sample:	No. 1 (from Field)
Date Analyzed:	July 15, 1944
Analyzed by:	Drug and Related Products Mission, Foreign Economic Administration, Mexico, D. F.

ITEM:	RESULTS:	INDICATION:[1]
pH	7.6	Slightly too alkaline
Aluminum	medium	Not harmful
Nitrite nitrogen	1 p. p. mill.	Not harmful
Sulfates	50 p. p. mill.	Presumably adequate
Ferric iron	low	Suitable
Manganese	very low	Presumably adequate
Magnesium	medium	Not harmful
Calcium (replaceable)	750 p. p. mill.	Presumably adequate
Ammonia nitrogen	low	Suitable
Chlorides	25 p. p. mill.	Not harmful
Nitrate nitrogen	16 p. p. mill.	Totally inadequate - needs nitrogen fertilizer
Phosphorus	100 lbs./acre	Inadequate - needs phosphate fertilizer
Potassium	350 lbs./acre	Presumably adequate

[1] Indication by author of this report.

cultivation. Some of the soils near the river beds and close to the large lake, Chapala, are alluvial. Some are of volcanic origin.

The Rendzina soils in the El Mante area of Tamaulipas are grayish to black in color. The natural vegetation of this area was grass and brush and contributed a large amount of organic matter to the soils, which are somewhat similar to those around Houston and Austin, Texas. Generally, in the flatter areas and near the rivers the soils seem to be quite deep.

FIGURE 6. — A 500-acre tomato field being harvested in the State of Sonora. Women are sorting the tomatoes at the edge of the field.

Cantaloups and watermelons are grown on slightly thinner soils that are of coarser textures, such as the sandy loam found along the Rio Grande in northern Tamaulipas. Somewhat similar light soils are found in some of the areas on the west coast.

As mentioned above, most of the soils in the various vegetable-producing areas lack organic matter, probably because of the absence of any systematic care or management. In most of these regions, little attention is given to the planning of rotations. Also, as would be expected, most of the soils are quite low in nitrogen. They usually respond very well to the application of manure and nitrogenous fertilizers. Some of the soils lack phosphorous, but nearly all have sufficient potassium.

Soils in the vegetable-producing areas are for the most part slightly alkaline. The pH readings are usually between 7 and 8. Most vegetable crops prefer a soil with a pH reading of about 7. Lime seldom needs to be added. In the regions where vegetable crops are grown for export, there seem to be no elements present in sufficient quantities to be injurious to the production of these crops. (For results of soil analyses made in 1944 in some of the representative vegetable-producing regions, see table 2.)

PRODUCTION

A complete study of the vegetable industry in Mexico is complicated by the variety of vegetables produced and the wide distribution of production throughout the country. Many vegetables which are produced in considerable volume in Mexico but which are not exported are left out of this discussion. Chickpeas, for example, are omitted, because the cultivation and marketing practices for this crop differ materially from those for the other export vegetables. Dry beans and potatoes are grown extensively and are occasionally exported, but they are not generally considered significant export crops. At the present time, statistics and information on total production and consumption of the different vegetable crops in Mexico are limited.

Only the production of that part of the crop which is for export will be discussed in detail. (See tables 3 and 4.)

TABLE 3. — *Production of vegetables in Mexico, by crop years 1929-30 to 1945-46*

CROP YEARS	TOMATOES	PEPPERS	PEAS	EGGPLANT	STRING BEANS	ONIONS	GARLIC	MELONS	WATERMELONS
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1929-30	179,260	35,194	27,326	(1)	3,739	23,305	7,738	14,930	51,790
1930-31	170,799	38,781	32,860	(1)	5,227	24,209	8,093	14,422	63,007
1931-32	190,447	37,683	31,759	880	7,390	28,225	6,958	18,223	63,437
1932-33	146,277	38,062	25,639	866	6,340	27,302	6,585	22,260	68,596
1933-34	112,441	37,269	18,779	492	6,466	20,538	7,676	22,414	70,205
1934-35	115,894	38,680	31,371	432	6,640	25,086	8,395	27,474	77,439
1935-36	151,502	39,621	20,448	461	8,770	26,530	7,985	26,109	63,583
1936-37	166,529	36,746	17,870	1,065	9,153	25,714	8,095	29,297	73,576
1937-38	144,015	43,907	18,148	1,224	10,452	30,589	7,251	30,789	77,855
1938-39	176,626	52,866	13,150	959	8,594	34,841	8,988	32,419	65,366
1939-40	177,166	59,242	14,566	906	9,306	32,771	12,782	39,945	72,121
1940-41	278,609	68,221	16,369	994	10,326	46,700	17,456	31,936	69,332
1941-42	345,318	74,661	13,741	1,129	12,299	55,115	19,606	34,010	61,350
1942-43	382,368	69,401	24,096	842	10,844	59,507	18,005	25,276	49,204
1943-44	460,865	71,982	30,490	1,232	11,195	62,040	19,722	30,992	56,682
1944-45	515,795	-	30,664	-	10,966	62,606	-	34,445	58,863
1945-46	492,378	-	24,508	-	-	-	-	-	-

[1] Not available prior to 1931-32.

Dirección General de Estadística.

Distribution by Crop

The tomato is by far the most important vegetable grown in Mexico for export. In 1946, 492,378,000 pounds of tomatoes were produced. In addition to the regular tomato (*Lycopersicon esculentum*), between 13,000,000 and 15,000,000 pounds of husk tomatoes, or ground cherries (*Physalis sp.*), are produced each year, according to statistics compiled by *Economía Rural*, but the general belief is that data on many of these tomatoes are not reported and that the crop is actually much larger than the statistics indicate. In some areas practically no other tomatoes are consumed. This husk tomato grown in Mexico often attains a size of 1 to 1.5 inches in diameter. It is sometimes substituted for common tomatoes, especially in making chili sauces. As it is not exported to any extent, no further consideration will be given to it here. There has been a marked increase in tomato production in Mexico since 1930, not only for export but also for domestic consumption. Total production of tomatoes in 1943 constituted more than half the combined weight of the nine principal vegetable crops.

In 1944, fresh peppers ranked second to tomatoes in the vegetable production of Mexico, amounting to about 71,982,000 pounds. This production includes many different varieties of peppers or chilies. Both the production and consumption of chilies have steadily increased. Those used for domestic consumption vary in size from large to very small, some being very strong and hot-flavored and others, such as the bell pepper, quite sweet. Large amounts of chilies are used in Mexico for making the many types of chili sauce.

About a third of the pepper crop is dried. The kinds which are dried are different, however, from the sweet bell pepper, which is exported fresh. In some years dried chilies form an important export item, especially from Baja California.

TABLE 4. – *Exports of vegetables from Mexico, expressed as percentages of production, 1929-30 to 1944-45*

CROP YEAR	TOMATOES	PEPPERS	PEAS	EGGPLANT	STRING BEANS	ONIONS	GARLIC	MELONS	WATERMELONS
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1929-30 . .	78.85	20.68	(1)	(1)	(1)	0.05	31.62	14.49	0.33
1930-31 . .	66.52	14.76	(1)	(1)	(1)	0	25.28	.09	.23
1931-32 . .	68.53	10.54	13.04	(1)	8.59	.32	27.98	7.59	1.37
1932-33 . .	32.01	4.04	52.53	37.18	13.91	.01	26.65	6.16	2.47
1933-34 . .	26.76	3.56	30.94	40.24	18.85	0	13.90	11.58	.02
1934-35 . .	48.11	9.16	17.58	(2)	16.54	.80	41.23	7.43	.21
1935-36 . .	40.73	14.79	21.57	69.85	13.23	.03	46.32	1.18	.12
1936-37 . .	44.48	14.25	45.19	60.85	2.70	.12	44.25	1.19	.28
1937-38 . .	33.36	11.91	20.47	62.99	2.91	.22	22.80	2.05	.06
1938-39 . .	17.10	3.96	25.37	49.43	.23	.25	24.01	2.47	.05
1939-40 . .	20.08	9.91	17.84	59.82	.78	.08	22.20	.02	.08
1940-41 . .	34.34	12.40	16.65	40.34	.85	2.33	36.61	.02	.24
1941-42 . .	45.09	17.63	15.30	39.06	1.01	4.86	43.90	.69	.24
1942-43 . .	53.73	19.06	64.49	42.40	2.46	20.31	48.80	[3] 6.62	3.34
1943-44 . .	46.56	13.04	62.16	62.82	4.06	9.81	26.32	[3] 4.15	(4)
1944-45 . .	44.12	–	32.37	–	–	3.37	–	[3] 1.39	(4)

[1] Not available.

[2] Not available because of a difference between calendar-year exports and crop-year production.

[3] Includes watermelons.

[4] Included with melons.

Dirección General de Estadística.

Of the vegetables considered in this report, onions ranked third in volume of production in 1944, totaling about 62,040,000 pounds. Onion and garlic production has been stimulated considerably during the war, although the total volume of production of watermelons has exceeded that of onions in most years. The 1944 outturn of peas, 30,490,000 pounds, was unusually large. Eggplant production is in small volume. In general, there has been an increase in the domestic consumption of most of the vegetables grown in Mexico, as well as in volume of exports.

Production for Export

The proportion of the total tomato crop of Mexico exported in 1944 was about 47 percent (table 4). Even though this percentage was higher than in some years previous, the quantity left for domestic consumption was nearly 135,000 tons as compared with only about 50,000 tons in 1937 (table 5). Tomato production, therefore, is not entirely dependent upon the export demand.

Since 1930, the proportion of the total pepper crop exported has varied from about 3.5 to about 20 percent. During these years, however, the volume exported has had little effect upon supplies for domestic consumption. Peppers produced for export are grown in areas relatively inaccessible to domestic consuming centers and are either exported or left unharvested.

The largest proportion - more than 64 percent - of the output of green peas was exported in 1943, a higher percentage than in any other recent year. As with peppers, the production of peas for export is concentrated on the west coast in the States of Sinaloa and Sonora, where production for domestic consumption is small.

Since about 1933, between 37 and 70 percent of the annual eggplant production has been exported. Only very small quantities of eggplant are consumed in Mexico.

TABLE 5. – *Consumption, total and per capita, of specified vegetables in Mexico, 1937-38 to 1944-45*

CROP YEAR	TOMATOES		PEPPERS		PEAS		EGGPLANT		STRING BEANS	
	TOTAL	PER CAPITA	TOTAL	PER CAPITA	TOTAL	PER CAPITA	TOTAL	PER CAPITA	TOTAL	PER CAPITA
	1,000 Pounds	*Pounds*	*1,000 Pounds*	*Pounds*	*1,000 Pounds*	*Pounds*	*1,000 Pounds*	*Pounds*	*1,000 Pounds*	*Pounds*
1937-38 . . .	98,770	5.18	38,537	2.02	14,243	0.75	475	0.02	10,159	0.53
1938-39 . . .	145,761	7.51	50,374	2.59	9,821	.51	463	.02	8,581	.44
1939-40 . . .	142,131	7.19	54,207	2.74	11,971	.61	364	.02	9,251	.47
1940-41 . . .	184,453	9.13	59,676	2.95	13,600	.67	593	.03	10,258	.51
1941-42 . . .	200,440	9.72	60,990	2.96	11,823	.57	703	.03	12,187	.59
1942-43 . . .	182,433	8.67	56,560	2.69	8,527	.41	507	.02	10,579	.50
1943-44 . . .	273,784	12.63	62,859	2.90	11,678	.54	425	.02	–	–
1944-45 . . .	269,516	12.15	–	–	20,671	.93	–	–	–	–
	ONIONS		GARLIC		MELONS		WATERMELONS			
1937-38 . . .	31,379	1.65	5,618	0.29	30,158	1.58	77,811	4.08		
1938-39 . . .	35,998	1.85	6,854	.35	31,617	1.63	65,333	3.37		
1939-40 . . .	33,556	1.70	9,980	.50	39,936	2.02	72,064	3.65		
1940-41 . . .	46,464	2.30	11,100	.55	31,932	1.58	69,169	3.42		
1941-42 . . .	55,295	2.68	11,025	.53	33,776	1.64	61,202	2.97		
1942-43 . . .	47,834	2.27	9,255	.44	23,603	1.12	47,559	2.26		
1943-44 . . .	–	–	14,572	.67	–	–	–	–		
1944-45 . . .	–	–	–	–	–	–	–	–		

Dirección de Economía Rural and Dirección General de Estadística.

The crop is grown in areas other than those which produce for export. An increasingly small part of the string-bean crop has been exported, the percentage in the past 3 years varying from about 1 to 4 percent. Before 1941, less than 1 percent of the onion production was exported, but, in 1943, a record of slightly more than 20 percent moved from the country. A considerable proportion of the garlic crop has been exported, varying from about 14 percent in the 1933 season to 49 in 1942. A decreasing percentage of the cantaloup crop has been exported in recent years, although exports have been expanding in volume. The reason for this is that production for domestic consumption has been increased more than that for export in response to a growing home demand. Watermelon exports in recent years were comparatively insignificant, amounting to less than 0.5 percent of the total production. However, beginning in 1943, there has been a marked increase in exports of both cantaloups and watermelons.

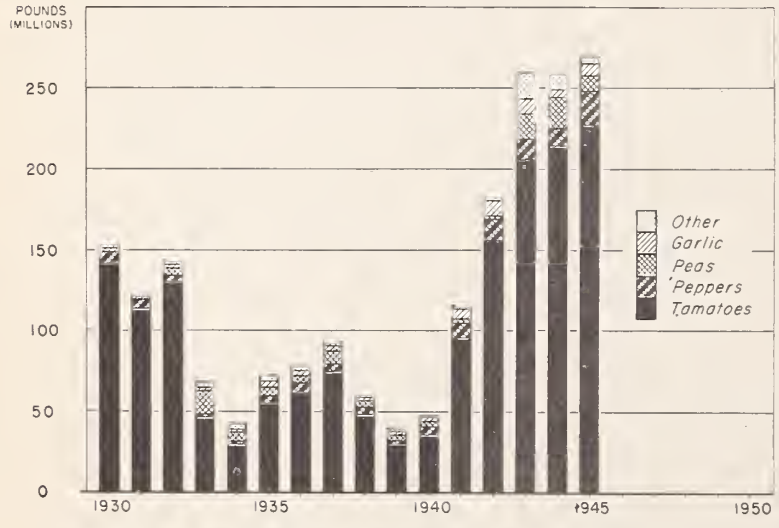

FIGURE 7. – Exports of specified vegetables from Mexico, calendar years 1930-45.

Until recently, production of tomatoes, peppers, and green peas for export has been almost entirely in the States of Sinaloa, Sonora, and Nayarit on the west coast of Mexico. Therefore, figures of production for export of these vegetables are almost entirely confined to the three States (table 6). The output in this western coastal area has totaled about 120,000 tons or more in the past 4 years. More than 30,000 acres are estimated to have been devoted to tomato production during the same seasons. As far back as the 1937-38 season, the acreage and production were equal to only about one-third, respectively, of the 1943-44 tomato acreage and production. Yields per acre seem to average from about 1.5 to 3 tons. This is low, compared with yields in the United States, largely because of cultural practices and climatic conditions. Actually, however, some of the better growers get much higher yields.

TABLE 6. — *Area, yield, and production of specified vegetables on the west coast of Mexico, crop years 1929-30 to 1945-46*

YEAR	TOMATOES			PEPPERS			PEAS		
	ACREAGE	YIELD	PRODUCTION	ACREAGE	YIELD	PRODUCTION	ACREAGE	YIELD	PRODUCTION
	Acres	*Pounds per acre*	*1,000 pounds*	*Acres*	*Pounds per acre*	*1,000 pounds*	*Acres*	*Pounds per acre*	*1,000 pounds*
1929-30 ..	26,474	3,091	81,837	1,791	1,679	3,007	11,846	1,989	23,563
1930-31 ..	26,314	3,068	80,739	1,653	2,601	4,299	11,073	2,571	28,464
1931-32 ..	30,974	3,424	106,043	1,572	2,573	4,045	12,911	2,116	27,319
1932-33 ..	23,484	2,710	63,542	1,307	2,658	3,474	12,661	1,642	20,785
1933-34 ..	11,589	3,184	36,898	1,075	2,750	2,956	8,246	1,773	14,621
1934-35 ..	12,644	3,513	44,416	1,413	3,088	4,363	10,640	2,351	25,018
1935-36 ..	15,508	4,549	70,545	1,641	2,520	4,136	6,316	2,482	15,679
1936-37 ..	15,315	5,126	78,506	1,937	1,736	3,362	5,090	2,173	11,060
1937-38 ..	12,474	4,823	60,157	1,745	1,538	2,683	4,870	2,162	10,527
1938-39 ..	15,380	4,750	73,060	3,252	2,080	6,764	2,943	2,281	6,713
1939-40 ..	13,116	4,230	55,483	4,673	1,935	9,043	2,894	1,927	5,578
1940-41 ..	19,963	5,690	113,583	4,418	2,430	10,736	4,369	1,744	7,621
1941-42 ..	27,238	5,585	152,133	6,830	2,442	16,680	4,448	1,538	6,841
1942-43 ..	30,818	6,321	194,814	6,392	2,478	15,842	9,061	1,762	15,966
1943-44 ..	39,064	5,340	208,584	6,350	2,217	14,079	12,157	1,601	19,469
1944-45 ..	45,852	5,254	240,919	-	-	-	12,202	1,342	16,380
1945-46 ..	43,786	5,101	223,363	-	-	-	9,820	1,094	10,743

Dirección de Economía Rural; statistics are for the States of Sonora, Sinaloa, and Nayarit.

A large proportion of the production of peppers in the States of Sonora, Sinaloa, and Nayarit is for export. Fluctuation in total exports from the country, therefore, corresponds with fluctuations in production in this area. Yields of peppers are also comparatively low, varying from about 0.75 to 1.5 tons per acre.

The average production of green peas in the three States represents a large proportion of the total production in the country. Exports fluctuate in accordance with variations in the acreages of these States. Acreage and production were at a high level early in the 1930's but decreased until about 1943, when both began to expand again. Average yields have varied from 0.75 to 1 ton per acre and in 1944 were only slightly over 0.5 ton per acre because of considerable damage from frosts and other climatic factors.

In the States of Sonora, Sinaloa, and Nayarit, the largest areas producing for export, vegetables grow in the river valleys, where irrigation is available. (See table 7.) The acreage in tomatoes is more widely distributed in these river valleys than that of the other vegetables. Peas are produced largely in the two southern

valleys of the State of Sonora and in small amounts in two small valleys in northern Sinaloa. Peppers are quite well distributed. Other vegetables are scattered here and there in the river valleys. In all, according to reports from the Southern Pacific Railroad of Mexico, about 70,000 acres were devoted to the production of these vegetables in the 1943-44 season.

TABLE 7. – *Estimated area planted to winter vegetables in western Mexico, 1943-44 season*

RIVER VALLEY OR AREA	TOMATOES	PEAS	PEPPERS	MIXED	TOTAL
	Acres	*Acres*	*Acres*	*Acres*	*Acres*
SONORA:					
Guaymas	875	-	80	24	979
Yaqui	994	5,500	85	211	6,790
Mayo	7,812	7,830	190	40	15,872
Total	9,681	13,330	355	275	23,641
SINALOA:					
Fuerte	9,400	160	387	75	10,022
Sinaloa	15,968	225	-	-	16,193
Mocorito	2,898	-	-	-	2,898
Culiacán	14,910	-	1,621	42	16,573
San Lorenzo	275	-	188	-	463
La Cruz	354	-	113	-	467
Mazatlán and Presidio	275	-	-	-	275
Rosario and Baluarte	175	-	-	-	175
Total	44,255	385	2,309	117	47,066
NAYARIT:					
Acaponeta	125	-	12	-	137
TOTAL 3 STATES	54,061	13,715	2,676	392	70,844

Source: Southern Pacific Railroad Company of Mexico.

Interest in the production of tomatoes in the southern part of Tamaulipas did not really begin to develop until the year 1942-43. During the 1943-44 season from 2,000 to 2,500 acres in this area were devoted to the production of tomatoes for export. For the 1944-45 season between 6,000 and 10,000 acres were estimated to have been set to plants.

In the main vegetable-producing area on the west coast, the times of seeding, planting, and, consequently, of harvesting tomatoes vary between the different valleys. In general, transplanting and harvesting are earlier in the northern part of the area and later in the southern part. (See table 8 for exports throughout the season from each valley.) Generally speaking, the export market is better in the earlier than in the latter part of the season. Any expansion in early season production would need to be made in the northern valleys, which have a climate conducive to earlier harvests. Likewise, expansion in late-season tomato production could be made in the southernmost valleys, where the climate is less favorable for early harvests. Usually the weather in the area as a whole is not so good during the earlier part of the season, and in many years the seedbeds and first settings are destroyed. This necessitates new seedbeds and new settings if the season is not too advanced for an export crop to mature.

TABLE 8. – *Carload arrivals of tomatoes at Nogales, 1942-43 season*

DATE OF ARRIVAL	STATE OF SONORA	STATE OF SINALOA					GRAND TOTAL
	MAYO VALLEY	FUERTE VALLEY	SINALOA VALLEY	MOCORITO VALLEY	CULIACÁN VALLEY	TOTAL	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
November	25	-	-	-	-	-	25
December 1-15 .	198	-	-	-	-	-	198
December 16-31 .	296	1	-	-	-	1	297
January 1-15 . .	[1]315	6	10	-	5	21	336
January 16-31 .	[1]332	30	58	-	30	118	450
February 1-15 .	186	72	130	-	57	259	445
February 16-28 .	84	117	245	-	88	450	534
March 1-15 . . .	32	287	[1]606	9	195	[1]1,097	[1]1,129
March 16-31 . .	24	[1]397	[1]691	[1]23	331	[1]1,442	[1]1,466
April 1-15 . . .	10	[1]415	440	[1]43	390	1,288	1,298
April 16-30 . .	4	310	224	[1]43	[1]495	1,072	1,076
May 1-15	2	34	26	7	100	167	169
Total	1,508	1,669	2,430	125	1,691	5,915	7,423

[1] Largest exports.

Source: Reported by American Vice Consul Lubert O. Sanderhoff, Mazatlán, Sinaloa, Mexico. Data from Pacific Brokerage Company, Nogales, Arizona.

FACTORS INFLUENCING PRODUCTION

Some of the factors influencing production are more or less fixed and cannot be greatly changed by man, since they include such items as rainfall, temperature, climate, topography, and basic soils. These factors, which have already been discussed, must be reasonably suitable for the production of vegetables before arrangements can be made for actual operations. On the other hand, there are other factors influencing production which are more or less controllable by man. Some of these have been most important in the development of the winter-vegetable industry in Mexico.

Irrigation and Drainage

Nearly all vegetable production in Mexico during the winter season is accomplished under irrigation, except in a few areas of heavy rainfall in the southern part of the country on the Gulf coast. More of the rivers are being harnessed with dams each year. It was estimated that in a single growing season, 1941-42, nearly 80,000 acres of land were opened up for cultivation in the west-coast State of Sinaloa. There are still large areas to be developed. In addition to dams, a number of individuals are constructing large wells for irrigation purposes. In general, future prospects are for larger cultivated areas in these vegetable-producing regions.

Various types of dams and water systems have been used. In some cases, the water is conducted through ditches under natural flow. In others, large pumps are required. The irrigation ditches are also used for drainage during the rainy season. In the opinion of many producers in the valleys on the west coast, relatively little trouble is experienced in conducting the water wherever desired. The cost of water varies a great deal, depending upon the need for facilities and the expense of constructing them. The expense of constructing dams is commonly recovered by increased rates for water. Each irrigated area has organizations that supervise all activities related to the use of water. Serious difficulties are occasionally experienced over water rights, especially in areas where the amount of water is particularly limited.

FIGURE 8. — A large well used to supply irrigation water for vegetables and truck crops in the State of Sinaloa. Most irrigation is supplied by river dams. More dams and wells are being constructed in these areas, and thus the amount of cultivated land will be increased.

Water is generally considered to be one of the most limiting factors in areas now producing vegetables for export. Land suitable for cultivation is plentiful provided irrigation is possible. As new water systems are built, more land will be brought under cultivation, and larger areas will be available for vegetable production. Some areas now cultivated, however, have occasional shortages of water. If the rainfall is light and the water in rivers and dams fails to come up to the normal level, water must be sparingly distributed during the latter part of the winter season.

Plans are under way and work has started on a number of new irrigation projects in the vegetable-producing areas. In the large west-coast area, four main projects are under construction. These are located in the Yaqui and Mayo River Valleys of Sonora and in the Sinaloa and the Culiacán River Valleys in Sinaloa. Some, especially those in the Yaqui River Valley, are enlargements and improvements of present irrigation systems. In other valleys, the work is largely that of completing new irrigation systems. Estimates indicated that between 250,000 and 300,000 acres of newly cultivated land would be brought into production by the end of 1946 in Sonora and Sinaloa. In the State of Guanajuato, where onions and garlic are produced in commercial quantities, a large project is under way to harness the Lerma River. It was estimated that this would bring nearly 40,000 acres of new land under irrigation and cultivation by the end of

FIGURE 9. — A typical scene in the State of Sinaloa during the months from December to May. These tomatoes are being harvested for export to the United States.

1946. In addition to these rather large irrigation systems to be developed in the next 2 years, many small projects are under construction, which will also increase the acreage for cultivation. As time permits and materials and machinery become available, more and more large wells will be constructed for irrigation purposes. These will further increase the acreage for cultivation.

FIGURE 10. — Supplies of packing material stacked up at an improvised packing shed in the State of Sinaloa.

Supplies of Materials

Nearly all the farm machinery, seed, and other materials used in Mexico for the production of vegetables for export have come from the United States No serious difficulties have been experienced in obtaining the seed needed during recent years, but machinery has been scarce, and many of the growers say that this shortage has greatly limited their production. Some insecticides, such as nicotine sulfate, calcium arsenate, and sulfur, which are at least partly imported from the United States, have also been difficult to get since the beginning of World War II.

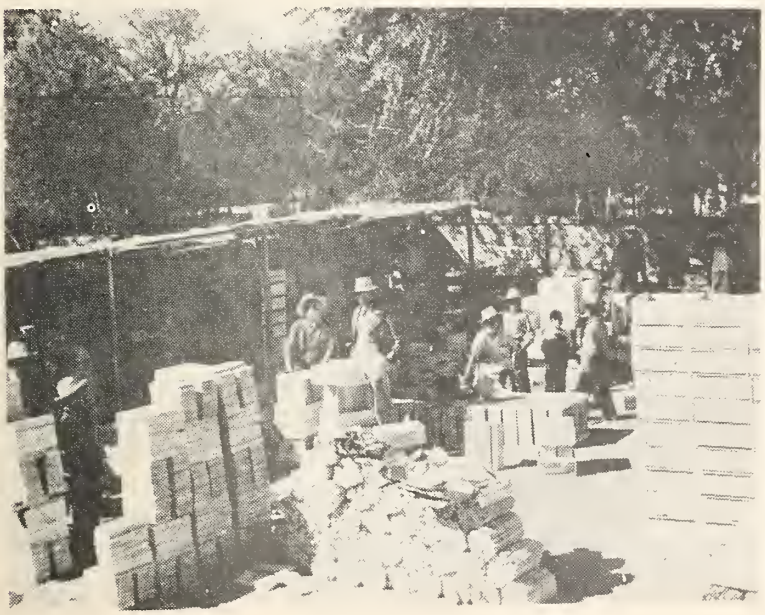

FIGURE 11. - The tomato shook is shipped to the producing centers as sawed lumber. This picture is part of a packing shed where the shook is being made into tomato lugs. Men make these lugs on a piece basis.

Maintaining a supply of containers for vegetables was one of the most serious problems confronting Mexican producers during the war. Until the 1943-44 season, a large number of the containers used for tomatoes and all those for peas came from the United States. Two lumber companies in Mexico have recently supplied some of the shook for tomato lugs and some of the material for containers of peppers, cantaloups, watermelons, etc., but they have concentrated mainly on shook for tomato lugs. The sacks normally used for transporting onions and garlic are available in Mexico.

The difficulty experienced during the past few years in obtaining the number of containers desired from the United States resulted from the shortage of supply there. If the 1943-44 Mexican tomato crop had been as large as expected in the early part of the season, losses because of lack of containers might have been serious. Mexican needs at the 1943-44 level of tomato production were estimated at about 6 million lugs. Licenses were granted for the export of about 3 million lugs from the United States, and Mexican sources were expected to supply the others. Somewhat less than the estimated total was actually needed, however, and no losses occurred for lack of shook.

Growers, in general, prefer shook made in the United States, because part of that made in Mexico has been of poor quality and has caused large losses in shipment. During 1943-44, some 12 or more lumber companies in Mexico became interested in making tomato-box shook, but they were largely inexperienced and did not know the exact requirements for good quality. The belief is, however, that through experience the lumber companies in Mexico are now able to produce a better quality product. The price in Mexico for a tomato lug has doubled in the past 2 years - from about 15 to 30 cents per lug.

Some of the difficulties encountered in supplying Mexican shook to the producers during the 1943-44 season resulted from the lack of transportation from lumber mills to producing areas. Near the end of the season, there appeared to be enough shook on hand in Mexico, but it did not move to the producing areas as quickly as it should have. The shook requirements for the 1944-45 season were about the same as in 1943-44, and producers hoped to obtain as much as possible from the United States. They like it and it is cheaper. Producers usually do not place their orders for Mexican shook until it is too late for the local lumber mills to make a large amount. The Mexican suppliers do not start work until they get contract orders. If producers, shook suppliers, and Government officials would consider the problem of supplying containers for vegetable crops in advance, the Mexican shook makers could plan their output accordingly.

Transportation

The development of transportation systems in Mexico would do much to stimulate the production of such crops as vegetables, which are bulky to handle. In the large producing area on the west coast, all long-distance transportation of farm products is handled by the Southern Pacific Railway of Mexico. This company has one main line along the coast and several short branches to important commercial sections. All long-distance transportation for the onion- and garlic-producing regions in the central part of the country is by the National Railways of Mexico. In the El Mante area of Tamaulipas, some of the tomatoes produced in the 1943-44 season were hauled to the port of Laredo, Texas, by truck. This area has the advantage of having a good highway direct to a border port. Probably some 25 to 40 percent of the crop in 1943-44 was hauled by truck. Of course, much of the short-distance transportation in nearly all the areas is done by truck. In some cases, mules are used, especially on the farms. In these areas, the roads are generally poor and in the wet season are practically impassable.

Unless roads are developed, all producing regions must be near railroad lines if they are to produce in commercial quantities. As new roads and highways are constructed, new areas for vegetable production may be developed and older areas expanded. The Southern Pacific Railway of Mexico has been greatly interested in the

development of the vegetable industry on the west coast. Approximately 60 percent of the freight hauled by this railroad consists of agricultural commodities. Every year it does considerable survey work in an effort to forecast production in each region and thus to be able to arrange for transportation of the products. Farmers are hesitant about producing unless they have some assurance that their crops can be transported. Many difficulties of this nature have been experienced in Mexico during the past few years. Likewise, difficulties have been experienced in obtaining replacements of worn-out trucks used locally on the farms. The other railroads in Mexico, especially the National Railways, probably could profit by making similar surveys of the expected production of agricultural products for transport in order to prepare themselves for handling these products promptly and efficiently.

Farm Organizations and Type of Farmers

Most of the vegetables for export are produced on private farms. Only small quantities are grown on *ejidos*.[2] A surprisingly large number of United States citizens are managing and furnishing capital for the commercial production of vegetables for export in the large region on the west coast of Mexico. Most of the actual manual labor in the producing and marketing of the crops is, however, done by Mexicans. During the depression of the early 1930's, when the market for Mexican winter vegetables was not favorable, when the United States import tariff on winter vegetables was doubled, and when many large estates in Mexico were expropriated, many United States citizens withdrew from their operations in Mexico. In the past 2 or 3 years, however, returns have been more promising, tariff duties have been reduced, and there has been greater security of holdings in Mexico; consequently, there has been a slight increase in the number of United States citizens operating on the west coast.

Also, a few of these are helping to develop the production of tomatoes in the El Mante area of southern Tamaulipas. This area is somewhat different from the others in that a large number of the producers are *ejidatarios* who are reported to have grown nearly half the tomatoes produced there during the 1944-45 season. The *Banco Nacional de Crédito Ejidal, S. A.* (National Bank of Credit for Ejidos) is helping to organize the industry in this area, especially in harvesting and marketing the crop. Mexicans carry on most of the operations in the central areas, which produce onions and garlic.

The large number of United States citizens producing vegetables for export, especially in the principal area on the west coast, make this industry in Mexico doubly important to the United States. A large part of the capital used is furnished by United States citizens. The proportion of the managers who are United States citizens is not known, but it is estimated to be between 10 and 25 percent.

One farm organization in the vegetable-producing area on the west coast in the State of Sinaloa is described as an example of what is quite commonly found in this area. This farm consists of about 741 acres, 247 owned by the manager and 247 acres owned by each of his two brothers. The governmental limitation on ownership of cultivated land by one person, without being endangered by expropriation, is 100 hectares or 247 acres. A farmer, however, often rents or combines the land owned by some other individuals, especially by close relatives, as is the case on this farm. All the land is in one block and is operated as one unit by the present manager.

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[2] An *ejido* is an agrarian community consisting of 20 or more eligible individuals to whom the Government has given limited ownership to land under the agrarian laws growing out of the Revolution; the land may be owned and worked either individually or collectively.

The main crops usually consist of about 100 acres of peppers, 200 acres of tomatoes, and 250 acres of sugarcane. In addition, there are usually about 75 acres of corn, 50 of pasture, 10 of vegetable plant beds, and the remainder of the land consists of building sites, irrigation ditches, waste, etc. These acreages vary from one year to another. For example, one year there may be only 25 or 50 acres of peppers and more in tomatoes. The manager adjusts these acreages according to his own judgment and the outlook for each of the crops. The livestock on the farm consists of 40 mules and a few cows which are kept for supplying milk for the manager and a few of the workers.

In general, modern machinery is used. Power is furnished by the 40 mules and 4 tractors: A small Fordson, a large McCormick Deering caterpillar, and 2 other caterpillars - 1 small and 1 large. Several modern disk plows, tractor cultivators, and tractor harrows are used. Also, a number of small pieces of equipment, especially cultivators, are used with the mules. Normally, about 100 men are employed, but during the vegetable-harvesting season, which lasts about 2 months, around 500 workers are employed. Boys are used for the simpler and easier jobs, such as setting plants. The buildings on the farm consist of a small house, an office and small barn combined, a couple of tool sheds, and some 20 or more shacks, belonging to the workers.

Many farms in the same vicinity are similar to the one described above but produce other crops, such as cotton, peanuts, chickpeas, sesame seed, wheat, peas, and flax. There are many different types of farm organizations and systems of farm management. Some private producers rent only a few acres of land and grow some such vegetables as tomatoes, whereas others may own a fairly large tract of land, or combine rented acreages into a large operating unit with as much as 1,000 acres. Somewhat similar farm organizations and management probably exist in the other vegetable-producing areas.

There are many ejidos in the areas which produce vegetables for export. A large number of these have been formed during the past few years, or since 1930, under the agrarian laws. With such crops as vegetables, which require extra capital and good management, and which involve a considerable amount of risk, the ejidatarios often seem unable to compete with private farmers. In many cases, ejidatarios even rent some of their land to private farmers for about 25 to 30 percent of the crops. Some of the large operators furnish the

FIGURE 12. — Some modern machinery is used in cultivating vegetables and truck crops in Mexico. This tractor and three-row cultivator, as most modern machinery in Mexico, came from the United States. Note the deep furrows into which irrigation water flows.

ejidatarios with plants, fertilizer, and water and supervise the work of cultivating and harvesting the crop; then they buy and ship the crop, giving the ejidatarios a flat price or a share of about 50 percent. Under this arrangement the ejidatario usually transports the crop to the packing shed of the large operator.

Probably this latter system has worked most favorably for vegetable production, at least on the west coast, when the ejidatarios got enough supervision and good management to ensure the use of the best methods for producing good-quality products. In many cases, however, the ejidatarios would rather rent their land outright to large individual operators and then work for someone else for a wage. In some instances, they even work on their own land for a wage.

The ejidatarios are encouraged to do their own growing and packing. When they pack the vegetables themselves, the fee of 5 cents per lug of tomatoes, and the equivalent for other vegetables, paid to the Confederation of Agricultural Associations of the State of Sinaloa, is refunded.

In addition to Mexican and United States operators, some Chinese grow vegetables in the large region on the west coast, and before the war there were also some Japanese growers. Most of the manual laborers are of Indian descent. They are not organized to any extent in any of the producing areas. For the sorting, grading, and packing of vegetables, women are commonly employed, some of whom have become especially skilled in certain phases of the packing process. Some of the producers pay on a piece basis for certain jobs, thus encouraging skill and rapidity. Entire families are used for picking and harvesting the vegetables, because usually each individual is paid according to the work he accomplishes. The cost of labor has increased a great deal in the past few years, but no serious trouble has been experienced for lack of workers.

Credit, Finance, and Capital Investment

There are many different ways of financing the production of vegetable crops in Mexico. On the west coast, in the largest producing area, about 90 percent of the capital is estimated to be furnished by United States citizens. Some of the larger producers, especially those from the United States, have enough capital to finance their own operations. Others have to borrow. On the other hand, some producers, as mentioned previously, grow winter vegetables themselves and also finance the production of other smaller growers, such as the ejidatarios. Much of the production in the new area of southern Tamaulipas is financed by the *Banco Nacional de Crédito Ejidal, S. A.* There are some private concerns, such as exporting firms, which finance growers in order to obtain their crops for marketing. This is especially true of part of the onions and garlic production.

The rate of interest, as in nearly all financial transactions in Mexico, is high, in most cases about 1 percent per month. This makes it difficult for the producers who lack capital, especially those growing such crops as winter vegetables, for which the market is uncertain, and in which the investment is high. Many of the large producers, nevertheless, have started upon the proverbial shoestring and later have been able to finance not only themselves but others as well. In contrast to these, some large operators have also lost sizable amounts of money in unfavorable years.

Little land in the vegetable-producing regions is being sold at the present time. Therefore, new producers have difficulty in purchasing land. The value of the land depends primarily upon the improvements on it and especially upon the development of water facilities. Some estimates of the value of land indicate that in most of the areas it varies from $50.00 to $100.00 per acre.

The total investment for producing vegetables in any volume is relatively large. Including the value of the land, producers who have 100 hectares, about 247 acres, are estimated to have a fixed investment of between $20,000 and $40,000. On the larger farms the machinery used is quite modern, especially on those producing tomatoes, peas, and peppers. At the present time, machinery is quite costly in Mexico. Not only is the fixed investment high, but operating costs are also high and oftentimes require a large amount of financing. Banks and credit institutions at Nogales, Arizona, furnish much of the capital used on the west coast. The cost of labor, seed, insecticides, fuel, etc., must be paid in cash, usually at the time of purchase.

Governmental Influence

Mention has been made previously of the Government's influence on farm organization through its expropriation activities under the agrarian laws. This not only discouraged large operators, and especially United States citizens, but it also resulted in the ejidal system. Even though only a small portion of vegetables are produced on the ejidos, these organizations are close by, and various arrangements are being worked out between them and large operators. These expropriation activities reached their highest point during the middle 1930's. In the past few years, there has been little expropriation, and there seems to be greater stability in farm holdings at the present time.

Probably the most influential governmental factor in Mexico has been the *aforo* or export tax. This tax was started on August 10, 1938, but it was not applied on most vegetables until 1942, when exports of vegetables increased considerably. This tax is determined by placing an official valuation upon a commodity and then taxing 12 percent of this value. The official valuation can be changed by the aforo committee, which meets on the 21st of each month. These valuations have been increased quite steadily since they were started (table 9).

Another variable in this tax is the constant change in the exemption percentage allowed growers. For example, the aforo tax on tomatoes during the 1943-44 season, for December, January, and to February 21, was about 0.73 cent per pound, or about 24.5 cents per lug of 33.5 pounds. This was increased on March 21 to about 0.83 cent per pound, or about 28 cents per lug. On April 21, it was reduced again to about 0.73 cent per pound. Actually, however, exporters were exempt in the first part of the year from paying 25 percent of this tax. This exemption was later increased to 31 percent, to 40 percent, to 50 percent, and finally, after April 26, to 75 percent. Actually, at the end of the year, exporters were paying only about 0.18 cent per pound, or about 6 cents per tomato lug. These exemptions also applied to most other vegetables.

The aforo tax is applied about in accordance with what the traffic will bear. Its primary purpose is for revenue, even though recently it has been levied on some other agricultural commodities to discourage exports. When growers are getting good prices for their products, they do not object so much to a high export tax. When a marked increase in this tax has been announced, however, a committee of the growers has usually gone to Mexico City to protest against it and to try to get it reduced. There has been much criticism of the application of such a tax because of its discouragement to exporters. There has also been recent criticism of the increases made in this tax, because of the attempt on the part of the United Nations to encourage and expand food production. Some have thought that it was contrary to the reduction in the United States tariff rate made under the Trade Agreement in January 1943 by the United States and Mexico.

TABLE 9. – *The "aforo" valuation[1] per pound on vegetables and truck crops for export*

MONTH OF CHANGE-EFFECTIVE 21ST DAY	TOMATOES	PEPPERS	PEAS	EGGPLANT	STRING BEANS	ONIONS	GARLIC	MELONS	WATERMELONS
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1938 Aug. 10 . .	None	1.31	1.68	1.87	1.40	0.75	1.03	1.12	0.56
" Nov. . . .	1.12	1.31	1.68	1.87	1.40	.75	1.03	1.12	.56
" Dec. . . .	1.12	1.31	1.68	1.87	1.40	.75	3.74	1.12	.56
1939 Jan. . . .	1.12	1.31	1.68	1.87	1.40	.75	1.50	1.12	.56
" June . . .	1.12	1.12	1.68	1.87	1.40	.75	2.06	1.12	.56
" Sept. . . .	1.12	1.12	1.68	1.87	1.40	1.03	2.06	1.12	.56
1940 Feb. . . .	1.12	1.12	1.68	1.87	1.40	1.03	1.22	1.12	.56
" Mar. . . .	4.02	14.50	.84	1.87	1.40	1.03	1.22	1.12	.56
" Nov. . . .	1.03	None	.84	1.87	1.40	1.03	1.22	1.12	.56
" Dec. . . .	2.43	None	.84	1.87	1.40	1.03	1.22	1.12	.56
1941 Jan. . . .	2.43	3.46	.84	1.87	1.40	1.03	1.22	1.12	.56
" Feb. . . .	3.93	4.58	6.36	1.87	1.40	1.03	1.22	1.12	.56
" Mar. . . .	3.27	4.58	2.90	1.87	1.40	1.03	1.22	1.12	.56
" Apr. . . .	3.27	4.58	2.90	1.87	1.40	1.03	2.62	1.12	.56
" May	4.68	4.58	2.90	1.87	1.40	1.03	2.62	1.12	.56
1942 Jan. . . .	3.46	2.53	2.90	1.87	1.40	1.03	2.62	1.12	.56
" Feb. . . .	3.46	2.53	2.90	1.87	1.40	1.03	2.06	1.12	.56
" Mar. . . .	3.46	2.62	2.62	1.87	1.40	1.03	None	1.12	.56
" Apr. . . .	2.15	3.18	1.96	1.87	1.40	1.03	None	1.12	.56
" May	2.90	3.18	1.96	1.87	1.40	1.03	None	1.12	.56
1943 Jan. . . .	6.92	5.71	4.49	1.87	1.40	1.03	None	1.12	.56
" Dec. . . .	6.08	5.71	4.49	1.87	1.40	1.03	None	1.12	.56
1944 Jan. . . .	6.08	5.71	4.49	1.87	1.40	1.03	8.42	1.12	.56
" Feb. . . .	6.08	6.45	6.83	1.87	1.40	2.62	10.76	1.12	.56
" Mar. . . .	6.92	6.45	3.65	1.87	1.40	2.62	6.55	1.12	.56
" Apr. . . .	6.08	6.45	3.65	1.87	1.40	2.62	4.21	1.12	.56
" Dec. . . .	6.08	6.45	3.65	1.87	1.40	2.62	4.21	1.12	.56
1945 Jan. . . .	6.08	6.45	6.83	1.87	1.40	2.62	4.21	1.12	.56
" Feb. . . .	6.08	8.89	5.14	1.87	1.40	2.62	4.21	1.12	.56
" Mar. . . .	5.52	8.89	6.45	1.87	1.40	2.62	4.21	1.12	.56
" May	4.58	8.89	6.45	1.87	1.40	2.62	14.03	1.12	.56
" Nov. . . .	7.58	9.16	6.45	1.87	1.40	0.93	7.48	1.12	.56
" Dec. . . .	7.58	8.89	6.45	1.87	1.40	0.93	7.48	1.12	.56
1946 Feb. . . .	7.58	11.13	5.42	1.87	1.40	0.93	7.48	1.12	.56
" Mar. . . .	7.58	6.26	5.42	1.87	1.40	0.93	5.14	1.12	.56

[1] This tax is determined by taking 12 percent of these valuations.

Source: *Dirección General de Estadística.*

Production is influenced in some of the States in which vegetables are produced by the application of production and sales taxes to exports. (For methods of calculating such taxes in the States of Sinaloa and Sonora, see appendix tables 10 and 11) These taxes usually amount to between $10.00 and $35.00 per car.

Production undoubtedly has also been affected by the tariff on imports into the United States. For example, the high tariff rate for tomatoes of 3 cents per pound between 1930 and 1943 discouraged producers in Mexico, especially during the depression years. While growers in the States were probably protected from Mexican competition, a larger supply of tomatoes might have been available in the United States if a lower tariff rate had prevailed. The same thing could be said with regard to peppers and peas and, to some extent, to string beans, garlic, and watermelons.

Under the Trade Agreement the new rate on tomatoes (table 10) is only for the duration of the emergency; 30 days after the President proclaims the emergency over, the rate will be changed from 1.5 to 2.25 cents per pound. This may be enough to discourage production a great deal. The reduction of 1.5 cents per pound for tomatoes

under the Trade Agreement, effective January 30, 1943, increased the returns to producers by about 51 cents per lug. Part of this increase in returns, obtained through the reduction in the United States tariff, was offset, however, by a higher aforo (export tax) applied by Mexico. Prices for the commodities increased, and probably the Mexicans, in line with their policy of changing valuations on export commodities with price changes, increased the aforo valuation, and thus, the aforo tax.

TABLE 10. – *United States tariff rates on imports of fresh vegetables and truck crops from Mexico*

PRODUCTS	RATES PREVAILING	
	BEFORE TRADE AGREEMENT[1]	UNDER TRADE AGREEMENT[1]
	Cents per pound	*Cents per pound*
Tomatoes	3.0	[2]1.5
Peppers	2.5	1.5
Peas	3.9	2.0
Eggplant:		
Dec. 1 to Mar. 31	1.5	1.2
Apr. 1 to Nov. 30	1.5	1.5
String beans	3.5	2.0
Onions	2.5	2.5
Garlic	1.5	.75
Cucumbers:		
Dec. 1 to Feb. 28	3.0	2.4
Mar. 1 to Nov. 30	3.0	3.0
	Percent ad valorem	*Percent ad valorem*
Cantaloups	35	35
Watermelons	35	20

[1] Effective January 30, 1943.

[2] This rate on tomatoes will be terminated 30 days after President of United States proclaims the end of the emergency period; 2½ cents will then apply.

The Governments of Mexico and the United States, otherwise, have not attempted to interfere to any great degree with the production of vegetables for export in Mexico. There has been some talk among the Mexican officials about the possibility of controlling acreage, in one way or another, in line with the probably export demand. These officials have worried somewhat about the increase of production in the past few years. They fear that considerable losses will take place when the United States demand falls off, unless some control is exercised over production.

Competition with Other Crops

The amount of cultivated land in Mexico is limited. Therefore, doubt is expressed as to whether the new land being brought into cultivation is sufficient to take care of the increased population and the greater food requirements of the Mexican people. For this reason, there is more and more competition among crops for the use of the land. This was especially felt during 1944. Because of a rather poor harvest that year, it was necessary to import large amounts of essential food products, such as corn and wheat. Consequently, there is general interest, and encouragement by certain Government agencies, in the increased production of such crops as corn, wheat, sugarcane, etc. In some cases slightly higher prices and greater returns are being offered for such crops. Farmers must decide which crops will be most profitable; if corn, for example, offers greater returns than vegetables, they are likely to grow more corn and fewer vegetables.

In each of the areas where vegetables are produced, other crops of importance to Mexico are also produced. Corn is grown to some extent in every area. Quite common,

also, are such crops as sugarcane, cotton, wheat, chickpeas, and flax. A specific example of the competition between these crops is in the Los Mochis area in the State of Sinaloa. A large amount of sugarcane is produced in this area, as well as a large volume of vegetables. There is insufficient water for the irrigation of all the various crops; so, when the cane plantings are large, the vegetable plantings are likely to be restricted. The producers have been encouraged by the Government to maintain sugarcane plantings and possibly to increase them. As there has been a deficit in sugarcane production, further encouragement is likely to be given by the Government to sugarcane planting. This probably would tend to reduce the vegetable acreage in this area.

Competition in Other Countries

Another factor that definitely influences the volume of vegetable production for export from Mexico is the competition of other producing areas supplying markets in the United States and Canada. Exports from Mexico come into direct competition with the late-fall, winter, and spring production of Texas and Florida, particularly, and to some extent with that of California and Cuba. The United States normally imports fresh tomatoes from Mexico and Cuba and at the same time exports to Canada. Mexico and the United States have each supplied Canada with about 40 to 45 percent of its imports during the late-fall, winter, and spring months, with most of the remaining 10 to 20 percent coming from Bermuda.

Tomatoes, in relatively small quantities, are usually harvested earlier in the year in Mexico than in the United States; therefore, this early harvest does not meet much competition. Production in the tomato areas of the United States is frequently quite hazardous, and frosts oftentimes destroy some of the crops. When the United States crop is large, however, Mexico finds it difficult to compete with it, owing to the disadvantage of long hauls and high transportation costs, as well as the United States tariff and Mexican export taxes. During the past 3 or 4 years, Texas has been the most important area in the United States competing with Mexican tomatoes during the late-fall, winter, and spring months. Estimates indicate that at least 50 percent of the tomatoes exported from the United States to Canada come from Texas.

Prior to 1941, imports of tomatoes into the United States from Cuba were larger than those from Mexico. During the 1942-43 and 1943-44 seasons, especially, exports from Mexico to the United States were increased, mainly as a result of the rising levels of purchasing power in the United States and the diminution of imports from Cuba occasioned by a shortage of shipping. Although the future expansion of production in Cuba is believed to have certain limitations, Cuba enjoys a 20-percent tariff preference in the United States over Mexico, and a sharp rebound in exports to the United States from Cuba is likely to take place in the next few years. The Cuban crop of tomatoes normally competes mostly in the eastern markets of the United States. The Texas crop and some of the Florida crop are likely to compete more with Mexican tomatoes in the central part of the United States and in Canada. Weather conditions during the growing season in Texas, Florida, and Cuba will continue, however, to influence the volume of Mexican exports in any given season; and, as in the past, they will frequently make or break the market.

The United States is more nearly self-sufficing in the production of winter peas than of tomatoes. Mexico is about the only country exporting peas to the United States; it also exports some quantities to Canada. Probably the most important area in the United States that competes with Mexico in the production of peas is the

Imperial Valley of California. The United States also competes in the exportation of peas to Canada. A very large proportion of the pea exports from the United States to Canada come from California, estimated at 86 percent of the total value of United States pea exports to Canada during 1935-39.

The market for peppers from Mexico is almost exclusively in the United States. Prior to 1940-41, Cuba and Mexico exported about equal quantities of peppers to the United States. From that time until at least the 1944-45 season, exports from Mexico were much the larger. Florida has been the most important competitor of Mexico in the production of peppers.

Normally, there is no great demand for Mexican onions in the United States. In recent years, however, because of the wartime emergency, the demand has been strengthened, and exports have been made. Texas is the chief competing area. The demand for garlic seems to be relatively stable. Cantaloups and watermelons from Mexico compete with the producing areas in the southern part of the United States, and it is usually necessary to export the Mexican crop, which is relatively small, before these producing areas in the United States come into heavy production. Before the war, Cuba supplied about 90 percent of United States imports of eggplant, and Mexico supplied about 10 percent. Because of increased production in the United States, Mexico appears likely to have only a limited market for from 10,000 to 20,000 bushels of eggplant per year in the United States. If this trend continues, it may limit exports from both Mexico and Cuba.

TABLE 11. – *Exports of specified vegetables from Mexico, calendar years 1930-45*

CALENDAR YEAR	TOMATOES	PEPPERS	PEAS	EGG-PLANT	STRING BEANS	ONIONS	GARLIC	MELONS	WATER-MELONS	TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1930	141,341	7,277	(1)	(1)	(1)	11	2,447	2,163	170	153,409
1931	113,616	5,723	(1)	(1)	(1)	0	2,046	13	146	121,544
1932	130,515	3,973	4,142	(1)	635	90	1,947	1,384	871	143,557
1933	46,819	1,539	13,468	322	882	2	1,755	1,371	1,693	67,851
1934	30,086	1,325	5,811	198	1,219	0	1,067	2,595	11	42,312
1935	55,752	3,545	5,514	522	1,098	201	3,461	2,042	163	72,298
1936	61,707	5,858	4,411	322	1,160	7	3,699	309	77	77,550
1937	74,075	5,236	8,075	648	247	31	3,582	350	203	92,447
1938	48,043	5,231	3,715	771	304	68	1,653	630	44	60,459
1939	30,210	2,092	3,336	474	20	86	2,158	802	33	39,211
1940	35,573	5,868	2,599	542	73	26	2,837	9	57	47,584
1941	95,666	8,459	2,725	401	88	1,087	6,391	5	163	114,985
1942	155,707	13,163	2,103	441	124	2,679	8,607	233	148	183,205
1943	205,444	13,225	15,540	357	267	12,083	8,787	1,673	1,645	259,021
1944	214,567	9,385	18,953	774	454	6,085	5,190	[2]3,640	(3)	259,048
1945	227,557	21,109	9,925	648	-	2,112	6,530	[2]1,301	(3)	[4]269,182

[1] If any, not separately reported.

[2] Includes watermelons.

[3] Included with melons.

[4] Incomplete.

Dirección General de Estadística.

EXPORTS

The largest part of the vegetable-export industry of Mexico today consists of tomatoes (table 11). Since 1942, more than 150 million pounds have been exported annually. After tomatoes, in the order of importance, the principal vegetables for export in recent years have been peppers, peas, and garlic. Exports of onions, cantaloups, and watermelons have varied a great deal from one year to another. During recent years, exports of most vegetables have increased. Cuba is the most important country competing with Mexico for the fresh winter-vegetable markets in the United States. Mexico, however, enjoyed special advantage during the war years because of its geographic position with reference to the United States and because of the availability of land, labor, etc., for the increased production of winter vegetables.

The greatest interest today is in exports of tomatoes. Until the past 2 years, practically all these originated on the west coast of Mexico. The volume of such exports reached a peak in 1942-43, when about 7,419 cars passed through the port of Nogales. In that same year, interest began to develop in producing tomatoes for export in the southern part of the State of Tamaulipas. About 150 cars moved from this area that year, and a rapid increase occurred thereafter. In 1943-44 about 400 cars were exported and 550 during 1944-45. However, much of the 1944-45 crop spoiled in the fields for lack of transportation. This area appears likely to become important for exporting tomatoes to the United States, and at present it could apparently compete quite favorably with the west coast of Mexico.

Export Season

Exports of tomatoes usually begin to move in the latter part of November, and they continue until the latter part of May. The period of heaviest shipment is the latter part of March and the first part of April (table 12). With favorable weather conditions, the peak movement starts earlier in the season. Weather conditions influence the volume at any one time, and the length of the shipping season each year depends as well on the supply situation in the United States. In 1944-45, about one-half the total exports of tomatoes were made in the months of March and April.

Pepper exports follow somewhat the pattern of tomato exports, the largest movement being in the months of March and April. Over the 5-year period 1938-42, from one-third to one-half the total exports were made in the months of March and April. Weather and climatic conditions are more influential in the production of peppers than in

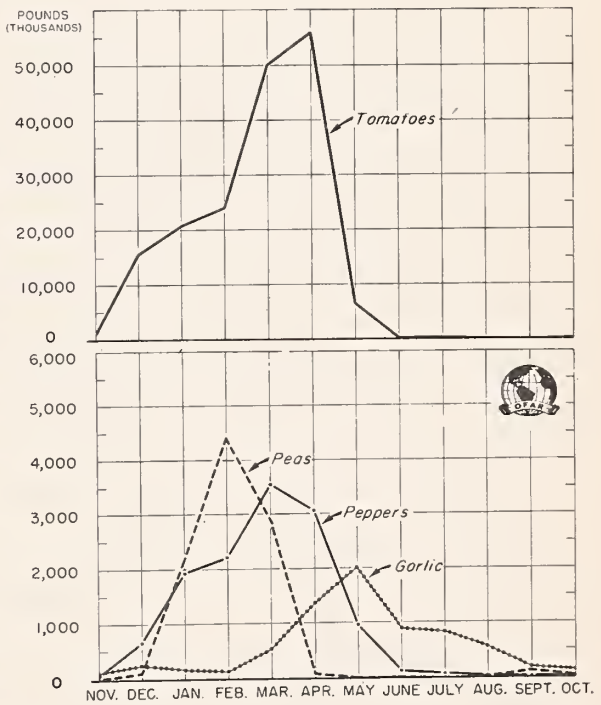

FIGURE 13. — Monthly exports of winter vegetables from Mexico, average 1940-41 to 1944-45.

TABLE 12. — *Exports of vegetables from Mexico, by months, specified years*

YEAR	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
TOMATOES													
1930-31 ..	0	2,332.5	13,476.7	5,853.2	41,969.0	40,042.1	7,998.3	6.6	0	0	0	0	111,678.4
1931-32 ..	0	4,270.3	7,048.1	11,307.4	23,152.7	41,146.7	40,756.4	2,045.9	0	0	0	0	129,727.5
1932-33 ..	0	5,057.4	3,020.3	4,808.2	5,328.5	27,385.5	4,971.4	235.9	0	0	0	0	50,807.2
1933-34 ..	6.6	1,062.6	2,301.6	2,632.3	7,405.3	10,778.3	5,348.4	0	0	2.2	0	0	29,537.3
1934-35 ..	0	1,618.2	5,134.5	10,921.6	13,781.0	15,194.1	6,834.3	0	(1)	(1)	0	0	53,483.7
1935-36 ..	41.9	3,844.8	6,029.6	8,101.9	15,877.5	19,360.8	4,561.3	1,616.0	0	0	(1)	(1)	59,433.8
1936-37 ..	650.4	5,509.3	5,961.2	4,261.5	12,262.0	36,616.2	10,333.0	227.1	0	0	0	(1)	75,820.7
1937-38 ..	(1)	4,413.6	8,229.8	8,062.2	9,347.5	14,199.8	2,059.1	0	0	(1)	(1)	0	46,312.0
1938-39 ..	557.8	5,586.5	3,754.4	2,517.7	6,062.7	12,438.4	875.2	(1)	(1)	(1)	0	0	31,792.7
1939-40 ..	434.3	4,127.0	4,190.9	7,425.1	11,699.8	7,444.9	780.4	(1)	0	0	0	(1)	36,102.4
1940-41 ..	0	4,032.2	11,455.1	14,969.2	31,704.4	30,432.3	2,813.1	(1)	0	0	0	(1)	95,406.3
1941-42 ..	970.0	3,322.3	11,516.8	6,391.1	59,237.6	59,021.6	5,255.8	229.3	339.5	2.2	24.3	55.1	146,365.6
1942-43 ..	326.3	13,307.0	19,493.1	21,578.6	65,703.7	71,997.8	8,329.0	8.8	8.8	6.6	2.2	8.8	200,770.7
1943-44 ..	1,611.6	16,695.4	20,392.6	27,601.6	45,249.4	62,152.1	14,376.2	(1)	(1)	2.2	(1)	(1)	188,081.1
1944-45 ..	3,873.5	40,919.6	40,985.7	50,242.8	51,067.4	57,579.7	2,526.5	17.6	(1)	66.1	(1)	(1)	247,278.9
1945-46 ..	3,690.5	21,380.7	31,785.9	37,908.1	42,974.3	58,801.1	1,530.0						
PEPPERS													
1937-38 ..	10.6	600.9	1,383.5	1,103.8	1,150.3	740.3	157.6	107.5	72.6	43.4	(1)	(1)	5,370.5
1938-39 ..	31.1	440.9	575.5	346.9	312.9	565.4	170.7	22.1	22.3	3.1	(1)	1.3	2,492.2
1939-40 ..	2.5	68.8	512.7	1,166.9	1,824.7	1,178.8	249.7	17.2	13.8	0	0	0	5,035.1
1940-41 ..	0	904.0	1,024.5	2,962.4	1,802.0	1,462.4	267.1	74.4	41.3	4.3	0	2.8	8,545.2
1941-42 ..	25.8	791.6	1,936.3	1,062.4	4,899.0	4,045.1	619.3	102.9	150.2	14.9	19.3	4.3	13,671.1
1942-43 ..	25.9	283.7	780.4	1,283.1	3,789.7	4,537.1	1,876.1	136.7	50.7	26.5	28.7	22.0	12,840.6
1943-44 ..	119.0	575.4	2,198.0	1,477.1	1,433.0	1,970.9	917.1	194.0	61.7	94.8	57.3	24.3	9,122.6
1944-45 ..	211.6	745.2	3,745.6	4,276.9	5,870.8	3,324.5	1,117.7	50.7	13.2	19.8	4.4	46.3	19,426.7
1945-46 ..	383.6	2,255.3	4,096.1	4,493.0	3,260.6	2,464.7	615.1						
PEAS, IN POD													
1937-38 ..	0	302.0	2,685.2	533.5	410.1	0	0	0	0	0	0	0	3,930.8
1938-39 ..	0	86.0	1,016.3	928.1	1,122.1	187.4	0	0	0	(1)	0	0	3,339.9
1939-40 ..	0	81.6	577.6	1,726.2	213.8	11.0	(1)	0	0	0	0	0	2,610.2
1940-41 ..	0	70.5	1,252.2	1,380.1	92.6	0	0	0	0	0	0	0	2,795.4
1941-42 ..	0	0	676.8	989.9	189.6	(1)	0	92.6	0	(1)	0	0	1,948.9
1942-43 ..	(1)	154.3	2,669.8	7,610.3	5,033.1	103.6	15.4	2.2	0	(1)	0	0	15,588.7
1943-44 ..	0	105.8	1,333.8	8,384.1	8,730.2	266.8	0	0	6.6	4.4	0	0	18,831.7
1944-45 ..	0	227.1	4,953.7	3,666.2	377.0	22.0	0	2.2	(1)	92.6	513.7	158.7	10,013.2
1945-46 ..	0	138.9	2,797.6	4,060.9	529.1	0	(1)						

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
EGGPLANT													
1937-38 ..	0	(1)	68.3	101.4	310.8	262.3	6.6	0	0	0	0	0	749.4
1938-39 ..	0	22.0	127.9	127.9	119.0	83.8	15.4	0	0	0	0	0	496.0
1939-40 ..	0	0	11.0	132.3	310.8	88.2	0	0	0	0	0	0	542.3
1940-41 ..	0	0	46.3	108.0	138.9	108.0	(1)	0	0	0	0	0	401.2
1941-42 ..	0	0	167.5	30.9	216.1	11.0	0	0	0	0	0	0	425.5
1942-43 ..	(1)	15.4	46.3	75.0	90.4	88.2	19.8	0	0	0	0	(2)	335.1
1943-44 ..	2.2	35.3	37.5	240.3	321.9	145.5	24.3	0	0	0	0	0	807.0
1944-45 ..	0	4.4	28.7	174.2	143.3	194.0	19.8	0	0	0	0	0	564.4
1945-46 ..	4.4	83.8											
GARLIC													
1937	169.8	22.0	326.3	864.2	626.1	443.1	416.7	377.0	79.4	200.6	13.2	44.1	3,582.5
1938	6.6	15.4	59.5	97.0	487.2	610.7	213.8	143.3	6.6	8.8	4.4	(1)	1,653.3
1939	22.0	17.6	200.6	683.4	683.4	273.4	218.3	33.1	(1)	2.2	8.8	15.4	2,158.2
1940	19.8	72.8	363.8	712.1	992.1	187.4	112.4	30.9	50.7	125.7	99.2	70.5	2,837.4
1941	97.0	306.4	769.4	1,574.1	1,629.2	716.5	220.5	141.1	346.1	326.3	143.3	121.3	6,391.2
1942	19.8	147.7	987.7	1,907.0	2,471.4	709.9	1,964.3	39.7	160.9	13.2	66.1	119.0	8,606.7
1943	548.9	55.1	335.1	1,327.2	1,547.6	1,007.5	881.8	1,547.6	138.9	185.2	291.0	921.5	8,787.4
1944	57.3	55.1	77.2	1,034.0	1,629.2	1,329.4	811.3	174.2	13.2	6.6	0	2.2	5,189.7
1945	81.6	79.4	445.3	985.5	2,771.2	663.6	251.3	811.3	187.4	154.3	59.5	39.7	6,530.1
1946	145.5	840.0	3,249.6	5,017.7	2,586.0								
MELONS AND WATERMELONS													
1937	0	0	19.8	68.3	205.0	260.1	0	0	0	0	0	0	553.2
1938	0	0	70.5	564.4	22.0	2.2	13.2	0	0	2.2	0	0	674.5
1939	0	0	165.3	637.1	33.1	0	0	0	0	0	0	0	835.5
1940	0	0	0	8.8	50.7	6.6	0	0	0	0	0	0	66.1
1941	0	0	2.2	39.7	33.1	92.6	0	0	0	0	0	0	167.6
1942	0	0	(1)	160.9	86.0	(1)	130.1	0	4.4	0	0	0	381.4
1943	0	0	(1)	176.4	930.3	1,794.5	403.4	13.2	0	0	0	0	3,317.8
1944	0	0	(1)	15.4	1,128.8	2,202.4	291.0	(1)	0	0	2.2	0	3,639.8
1945	0	0	0	17.6	167.5	831.1	235.9	0	0	(1)	0	48.5	1,300.6
1946	0	0											

[1] Less than 500 pounds.

[2] Less than 500 pounds and included in November of the 1943-44 season.

Source: *Dirección General de Estadística.*

the production of tomatoes and peas, since peppers seem to be more sensitive to these factors. Floods and frosts have caused considerable losses during the past few years.

Peas are largely exported from Mexico during January, February, and March. Here again the volume of exports each month is greatly dependent upon weather conditions in the early part of the season and the supply situation in the United States. The market for peas held up exceptionally well in 1944; hence, the largest exports were made late in the season, February and March. Practically no exports are made from May through November.

Exports of eggplant and string beans have been made mostly in the months of January, February, March, and April. Garlic is shipped out nearly every month of the year but mostly from March to August, with the largest volume in April and May. This product is not so perishable as most others and is usually held longer in the market. The crop in the United States, which is harvested in the fall of the year, furnishes a large supply during the early winter months; therefore the need for imports is principally in the spring and early summer months. Onions are exported mostly during the months of December to April, with the largest movement in the months of February and March. Exports of onions have been made in volume only recently. They may not continue to be heavy. They must reach the United States before large supplies are forthcoming from the early producing areas of the United States, principally Texas.

Cantaloups are exported from April to July. Watermelons move out almost at the same time of year, starting about April and extending to July, and occasionally as late as August or September. These exports are so small in relation to the total crop and in actual tonnage that they are relatively unimportant when compared with such crops as tomatoes.

TABLE 13. — *Exports of tomatoes from Mexico, by export points, 1931-44*

YEAR	NOGALES		NUEVO LAREDO		SAN JOSÉ DEL CABO		OTHERS		TOTAL	
	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE
	1,000 pounds	*Dollars*	*1,000 pounds*	*Dollars*	*1,000 pounds*	*Dollars*	*1,000 pounds*	*Dollars*	*1,000 pounds*	*Dollars*
1931..	107,116.5	2,663,171	61.8	1,228	6,256.8	85,499	182.3	1,846	113,617.4	2,751,744
1932..	116,441.9	2,600,029	477.2	4,245	13,289.3	165,901	305.2	3,049	130,513.6	2,773,224
1933..	35,784.7	741,461	1,209.9	12,888	9,664.8	127,372	160.8	430	46,820.2	882,151
1934..	23,700.9	591,845	1,748.3	20,061	4,389.2	54,597	249.0	2,926	30,087.4	669,429
1935..	54,061.0	660,057	280.0	3,961	1,249.8	15,585	162.4	1,659	55,753.2	681,262
1936..	55,662.9	667,598	1,455.4	13,915	4,001.9	49,904	579.9	6,395	61,700.1	737,812
1937..	70,196.7	582,477	910.2	13,604	2,108.0	19,918	859.4	7,772	74,074.3	623,771
1938..	47,238.7	401,428	445.5	2,983	298.3	1,860	59.5	743	48,042.0	407,014
1939..	29,520.4	221,647	158.0	1,167	513.7	5,864	20.0	143	30,212.1	228,821
1940..	34,153.2	293,839	1,054.2	8,412	55.0	643	310.3	3,734	35,572.7	306,628
1941..	94,493.6	793,949	913.4	10,303	-	-	260.2	10,290	95,667.2	814,542
1942..	154,652.9	1,261,145	890.6	7,526	1.3	31	160.7	2,552	155,705.5	1,271,254
1943..	200,925.0	1,334,413	4,090.5	62,125	-	-	420.7	6,590	205,436.2	1,403,128
1944[1].	158,682.4	1,785,995	10,697.3	343,922	-	-	391.6	9,413	169,771.3	2,139,330

[1] January to May 31.

Source: *Dirección General de Estadística, S. E. F.*

Export Points

Estimates indicate that at least 90 percent of all of the vegetable crops exported from Mexico in the 5 years 1938-39 to 1943-44 left the country through the

port of Nogales. Prior to 1943-44, more than 95 percent of the tomatoes were exported through the same port, but thereafter an increase occurred in the movement through the port of Nuevo Laredo-Laredo (table 13).

Before 1940, some tomatoes were exported from Baja California through San José del Cabo. The largest export made from this point was in 1932, when more than 6,500 tons were exported. Practically none have been exported from this area, however, since 1940. As far as is known, growers do not intend to produce large quantities in Baja California in the near future. Nevertheless, when shipping by water is easier, exports of tomatoes from that area may again become important.

FIGURE 14. — A trainload of fresh Mexican vegetables about ready to cross the border into the United States at Nogales, Sonora.

TABLE 14. — *Exports of peppers from Mexico, by export points, 1934 to 1944*

YEAR	NOGALES	CIUDAD JUÁREZ	OTHERS	TOTAL[1]
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1934	952.4	302.0	70.6	1,325.0
1935	3,157.0	244.7	138.9	3,540.6
1936	5,526.9	189.6	141.1	5,857.6
1937	4,876.6	165.3	194.0	5,235.9
1938	4,854.5	227.1	123.5	5,205.1
1939	1,858.5	55.1	169.8	2,083.4
1940	5,745.2	86.0	48.5	5,879.7
1941	8,139.4	211.6	125.7	8,476.7
1942	12,731.6	275.6	185.2	13,192.4
1943	11,955.5	954.6	315.3	13,225.4
1944 (Jan.-May 31)	7,689.6	125.7	180.8	7,996.1

[1] Exports for 1930 were 7,277.4 lbs.
" " 1931 " 5,723.1 "
" " 1932 " 3,974.9 "
" " 1933 " 1,538.8 "

Source: *Dirección General de Estadística.*

Exports through the port of Nogales became so large in 1943 and 1944 that it was difficult to move them across the border without delay. Loaded cars have to be held

TABLE 15. – *Exports of specified vegetables and truck crops from Mexico, by export points, 1941-44*

YEAR	NOGALES	NUEVO LAREDO	CIUDAD JUÁREZ	PIEDRAS NEGRAS	MATAMOROS	MEXICALI	TIJUANA	TAMPICO	VERACRUZ	REYNOSA	OTHERS	TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
PEAS												
1941	2,727	0	0	0	0	0	0	0	0	0	0	2,727
1942	2,083	0	0	0	0	0	0	0	0	0	0	2,083
1943	15,518	0	0	0	(1)	0	7	0	0	0	0	15,525
1944 (Jan.–May)	18,598	0	0	0	(1)	0	0	0	0	0	119	18,717
EGGPLANT												
1941	401	(1)	0	0	0	0	0	0	0	0	0	401
1942	430	9	2	0	0	0	0	0	0	0	0	441
1943	313	2	0	0	0	0	0	0	0	0	44	359
1944 (Jan.–June)	756	13	0	0	0	0	0	0	0	0	0	769
STRING BEANS												
1941	(1)	0	2	0	0	0	86	0	0	0	(1)	88
1942	20	0	0	0	0	(1)	103	0	0	0	0	123
1943	110	0	2	0	2	7	146	0	0	0	0	267
1944 (Jan.–June)	2	0	0	0	0	0	22	0	0	0	0	24
ONIONS												
1941	29	846	203	9	0	0	0	0	0	0	0	1,087
1942	0	1,905	64	472	236	0	0	0	0	0	2	2,679
1943	123	9,162	1,471	388	825	0	68	0	26	11	9	12,083
1944 (Jan.–June)	15	5,695	9	15	0	0	(1)	0	177	0	0	5,911
GARLIC												
1941	64	847	115	57	4	587	37	2,224	2,346	2	108	6,391
1942	335	2,119	15	33	62	734	9	3,322	1,744	4	232	8,609
1943	392	4,189	1,546	884	2	132	(1)	536	745	4	362	8,792
1944 (Jan.–June)	258	1.358	2,004	11	2	313	0	22	205	(1)	9	4,182
CANTALOUPS												
1941	0	4	0	0	0	0	0	0	0	0	0	4
1942	0	234	0	0	0	0	(1)	0	0	0	0	234
1943	1,460	130	4	0	2	0	0	0	0	77	0	1,673
1944 (Jan.–June)	2,117	26	2	0	0	0	0	0	0	4	29	2,178
WATERMELONS												
1941	73	0	0	0	0	88	0	0	0	2	0	163
1942	14	0	4	0	0	124	4	0	0	0	2	148
1943	399	0	35	0	117	507	0	0	0	587	0	1,645
1944 (Jan.–June)	1,061	0	9	0	4	55	0	0	0	24	18	1,171

[1] Less than 500 pounds.

Source: *Dirección General de Estadística.*

on the Mexican side of the border long enough to be opened and examined by inspectors and buyers. Space and sidings were lacking, however, for both empty and loaded cars of vegetables. The Southern Pacific Railway Company has attempted to improve the yard facilities at this point and hopes to be able to handle larger shipments.

Exports of tomatoes through the port of Nuevo Laredo-Laredo, prior to 1943 varied from 25 to 850 tons. In 1943 and 1944, exports through this point increased to nearly 5,500 tons. Plans are being made in the producing areas that send their tomatoes through this port for increased production in the next few years.

Exports of peppers, peas, cantaloups, watermelons, eggplant, and string beans have nearly all been made through the port of Nogales (tables 14 and 15).

Exports of garlic and onions have been made largely through Laredo with small amounts going through the port of El Paso. The volume of exports through different points for onions and garlic depends on the size of the crop in each producing area.

FIGURE 15. — Eggplant loaded in a car at Nogales, Sonora. Each fruit is wrapped individually and packed in crates similar to pepper crates. The cars are opened for inspection at the border.

Facilities for movement of vegetables across the frontier to the United States are much more developed at Nogales than at any other port in Mexico. Systems of grading and classification are well-established there. This port is well known among buyers so that sales are readily made and the vegetables are moved rapidly to their points of destination. Definite plans are made each year by the Southern Pacific Railroad of Mexico and other transportation agencies on the west coast for taking care of the vegetable crops during the harvesting period. Definite plans have been made at other export points for the transportation, inspection, and grading of products that were purchased directly or indirectly by United States Government organizations. Such was the case for onions. If tomato production increases in the areas that send the tomatoes through Laredo, attention will have to be given to the improvement of facilities at that port.

TOMATOES

Methods of Producing, Harvesting, and Packing for Export

Most of the available information regarding methods of producing, harvesting, and packing tomatoes is from the large area on the west coast of Mexico. Methods employed in the El Mante area in Tamaulipas are believed to be about the same. Some of the producers now operating in this new region formerly operated in the larger region on the west coast of Mexico.

Even though some parts of Mexico have a long growing season, tomatoes and peppers are usually planted in a seedbed and then transplanted to the fields. Thus, the irrigation and cultivation of large areas for a long period of time are avoided; and, even though the growing season may be long enough, part of it may not be favorable for the best development of the plants.

Varieties, Seed, and Production of Plants

Nearly all the tomatoes produced for export in Mexico are of the Marglobe variety. Such varieties as Stone, Bonnie-Best, and Rutgers have been tried. Considering the yields obtained and the ability of the tomatoes to stand up well under shipping, Marglobe seems to have proved superior to the others. In Mexico, many different names have been given to Marglobe by trade interests, but they all pertain to the same variety.

Nearly all the seed used in Mexico for producing the export crop of tomatoes is obtained from the United States. Some growers procure their supply directly from commercial seed houses in the United States. Others, especially the small growers, obtain theirs from exporting and marketing firms or other secondary supply agencies.

Seed is usually purchased in the summer and early fall months. In August or September seedbeds are started in the State of Sonora and in the new area of southern Tamaulipas. Some seedbeds are made as late as November, especially in central and southern Sinaloa and northern Nayarit. The bed is usually made in some part of the field in which the crop will be grown. The soil is plowed and worked down well, and the seed is sown in broad rows about 2 or 3 feet apart. Usually a furrow is made between each row in order to facilitate drainage or irrigation, whichever is needed. The bed is kept free of weeds, mostly by hand cultivation, or in some cases by the use of a small cultivator and a mule. Often some dusting for insects and diseases is done. Larger operators sometimes grow the plants and furnish them to the smaller growers with whom they have some kind of a producing and marketing contract.

The producer usually determines the acreage of tomatoes that he wishes to plant at the time he makes his seedbed. Most of the growers do not change their plans after putting out these seedbeds, because at that time they must estimate the number of plants that will be needed. One pound of tomato seed

FIGURE 16. — A tomato plant with a good set of tomatoes in the Mayo River Valley of southern Sonora. Even though the plants are set wide apart, the ground is covered when they mature. This fairly new alluvial soil received no fertilizer.

produces enough plants for about 8 or 10 acres of tomatoes. The acreage of tomatoes planted by any one grower depends upon a number of factors, most of which have been discussed previously in this report. One is his success, or his returns, during the previous year; another is the encouragement received from other growers, commission agents, buyers, and businessmen who are interested in tomatoes. Occasionally, a grower plans to harvest part of his tomatoes early and part late in the season. In that case, he may change his plans between making his first and last seedbeds, depending upon the progress of the season and the outlook for marketing tomatoes. If his first seedbeds are destroyed by floods, frosts, etc., he very likely will be inclined to set out a larger acreage in the latter part of the season.

Preparation of Soil in Fields

The soil for winter vegetables is prepared mostly with modern equipment. It is usually plowed with a tractor and then worked down with such pieces of equipment as a harrow, float, and roller. In some cases, the land is first plowed early, then irrigated by flooding the entire field, and finally plowed again. If new land is brought into cultivation, it first needs to be cleaned, and the refuse on it is burned before the plowing begins. Most producers agree that the best practice is to plow the land early in the summer and then work it down two or three times before the plants are set, but this is seldom done. Occasionally, difficulty is encountered in preparing the seedbed, because the preparation is made during the latter part of the rainy season. Some fields were not prepared well in flooded areas of the State of Sinaloa during the 1943-44 season, and the yields were definitely reduced as a result. Many tomato plants were set in mud, and the soil was thus packed and later clods were formed. Usually, however, the land needs to be irrigated from one to three times before the plants are set.

Transplanting

The tomato plants are moved from the seedbed to the field during the period September to December. In the large area on the west coast, transplanting starts first in southern Sonora and continues later in central Sinaloa and northern Nayarit. In the El Mante area, transplanting is expected to begin as early as late August or early September. Usually the plants are about 8 inches in height when they are transplanted. If the seedbeds are in one corner of the field in which the tomatoes are to be grown, the plants are usually carried from the seedbed in baskets. The rows for the tomatoes are marked by using a one-horse furrow plow; then, in most cases, irrigation water is run through the furrow and left to soak into the soil before transplanting. The rows are placed about 7 or 8 feet apart, and the plants are set in the rows about 3.5 or 4 feet apart. This makes about 1,300 to 1,800 plants per acre. The distance between rows and plants is much greater than might be expected and greater than commonly found in the United States.

Transplanting is done by hand in nearly all cases, the use of a transplanting machine of any kind being exceptional. It is a dirty job because of irrigation immediately before transplanting. Often a crew of young boys are hired for this work.

Fertilizing and Manuring

The soil used for producing vegetables and truck crops in Mexico receives little fertilizer or manure. Some of the virgin soil, when newly cultivated, is fertile, and the producers think it does not need fertilizer. A few growers have used as much

as 600 or 700 pounds per acre of bat guano or goat manure. One quite successful farmer uses a total of 525 pounds per acre of bat guano, making three applications of about 175 pounds each. The first is put on by hand along the rows when the plants begin to blossom. The guano is obtained from nearby caves and costs about $12.70 per short ton.

FIGURE 17. — Applying Chilean nitrate on a pepper field. Fertilizer is more commonly used on tomatoes. It is applied at the side of the row by hand and often in 2 or 3 separate applications. Only a few farmers use any fertilizer.

A few growers use Chilean nitrate fertilizer at a rate of between 150 and 200 pounds per acre. The cost of such fertilizer is higher than the cost of bat guano. It is also applied by hand along the side of the row. Phosphate fertilizer is seldom used. Even though a majority of the growers do not use any fertilizer, the belief is that tomatoes in these producing areas would respond quite favorably to at least nitrogen applications. Nearly all commercial fertilizer is obtained from Mexico City or through agents stationed at Mexico City.

Irrigation

The land for tomatoes is irrigated from one to three times before the plants are set, about two to four times before the harvest, and one to three times after the harvest begins. In all, the tomato land is irrigated from 5 to 10 times. Considerable work is involved in constructing the canals, getting the water from streams, reservoirs, or from wells, and putting it on the land. One man can irrigate from 2 to 5 acres per day.

Cultivation

The most common type of cultivation is with a mule and a sort of furrow plow used on both sides of the row. This furrow plow is used especially in the early stages of growth in order to fill in the furrow where the tomato plants have been set. After this operation, a toothed cultivator is used for most of the work. In this way the land is leveled and the soil is thrown toward the plants in the row. By the time of the last cultivation the soil is in ridges along the row. Some of the larger operators use tractors and tractor cultivators. Usually from four to seven cultivations are made. Many of the growers do some hoeing, possibly going over the field once or twice, especially if weeds are serious. More hoeing usually needs to be done if the land has been newly cleared.

Insects and Diseases and Their Control

About the most serious pest of tomatoes is the tomato pinworm, *Keiferia lycopersicella* (Busck). Government inspectors at the shipping points are constantly

watching for these worms in the tomato fruit; and, when they are found, the tomatoes are graded accordingly. Other insects quite commonly found in the tomato fruit are the corn-ear worm *Heliothis armigera* (Hbn.) and the fall army worm *Laphygma frugiperda* (A. & S.). Among the most common diseases found are nailhead spot, anthracnose, soft rots, fusarium wilt, and the leaf spot *Altenaria solani.*

Various methods are used to control these insects and diseases. A common practice is to dust the plants with a hand duster, using calcium arsenate and occasionally sulfur. A mixture of one part of calcium to four parts of sulfur is used, or in some cases one part of calcium to one part of sulfur. Some growers dust the plants only once, whereas others dust as often as six or seven times. Usually from two to four times is sufficient. These dusting materials have become quite high in price, and this has discouraged producers from using large amounts. Sulfur recently cost as much as 8 to 14 cents per pound and calcium arsenate, from 10 to 15 cents per pound.

The most recent development has been the use of an airplane for dusting. This was first started in the 1942-43 season. With this method, about 225 acres can be dusted in 1 hour, and the amount applied can be regulated as desired. With the plane, from 5 to 10 pounds of material per acre are used, whereas with hand dusting at least 10 to 20 pounds per acre are needed. Dusting by plane is done by flying very close to the ground. A strip of about 40 feet is covered each time the field is crossed. In plane dusting, the coverage of the plants seems to be better than with hand dusting, because the dust falls in smaller particles over all surfaces of the plant. Dusting by plane costs from 50 to 75 cents per acre for each application. Dusting is usually done early in the morning, or late in the evening, when there is relatively little wind.

Harvesting

The harvesting of tomatoes normally begins in Sonora and in southern Tamaulipas in November. In the State of Sonora it is usually finished by the end of January or in February. In the States of Sinaloa and Nayarit harvesting begins about January and continues until late in the spring, or as long as the tomatoes last and competition is not too severe from the producing areas in the United States. Usually harvesting is over by the end of May. The largest volume harvested is in the latter part of March and the first part of April. Harvesting is usually completed by the end of March in southern Tamaulipas.

Tomatoes are picked and shipped while green. Picking is done by men, women, and children. In the large fields crews of pickers are kept down to about 20 in each group in order to maintain efficiency among the pickers. The tomatoes are usually picked into lugs and carried to the edge of the field. Often they are sorted there by women, and then the good tomatoes are loaded on trucks to be hauled to the packing shed. As pickers oftentimes do not know the type of tomato that is most desirable a large amount of sorting must be done if good products are to be shipped.

Pickers average about one-third of a ton per day, or from 15 to 20 lugs of 33.5 pounds each. They are supposed to work 8 hours a day, but often they do not get in more than 6 hours. Oftentimes the pay for picking tomatoes is on a piece basis per lug. Sometimes, however, a daily wage is paid. When the former method is followed, about 4 or 5 cents per sorted lug is the rate for picking. This is much higher than was paid during the 1930's. Each field is usually picked about 8 times, but the number of times varies from 5 to 10. Usually tomatoes are picked about every 4 or 5 days or every week.

Packing

Since the tomatoes are sent to the United States, nearly all of them are packed according to United States standards. The standard-sized lug has outside measurements of 7 inches deep, 14 inches wide, and 17.5 inches long (fig. 1). Every large grower maintains some sort of packing shed, usually located close to a railroad track. Occasionally the shed is in the field, and the packed tomatoes are hauled to the railroad station. In the towns located in the valleys along the railroad in the tomato-producing areas, there are a number of packing sheds. The tomatoes are hauled to the shed from the field in trucks or by wagons and carts. Even though they may have been sorted once in the field, they are always sorted again at the packing shed. Usually women do this type of work. The quality of the product shipped often depends upon the training and supervision received in this sorting process. The proportion of the tomatoes actually sorted out for export varies from 25 to 75 percent. Much depends upon how well they were picked, what portion of them has a ready market, and their quality. When the market is good, some of the growers pack two grades of tomatoes. When this is done, about three-fourths of the pack are firsts and one-fourth seconds.

After the tomatoes are sorted, they are wrapped individually in a thin tissuelike paper, 9 inches by 9 inches in size; then they are placed by hand in new lugs. The tomatoes are placed in the lug usually in three tiers, with from 5 to 7 tomatoes in each direction. A lug containing 6 tomatoes in each direction is commonly called by the trade a 6-x-6. One that contains 5 tomatoes one way and 6 the other is called a 6-x-5. Lugs usually vary from 5 x 5's to 7 x 7's. Small tomatoes packed in the 6-x-7, or 7-x-7, lugs are usually placed in 3.5 tiers. As soon as the lug is filled with tomatoes, a flexible top is nailed on it. Then the lugs are ranked in tiers in a freight car so that there are from about 624 to 900 lugs per car. Special strips of lumber and bracing material called dunnage are used in the cars in order to keep the tomato lugs firmly in place and to prevent them from being tossed around and injured in shipment.

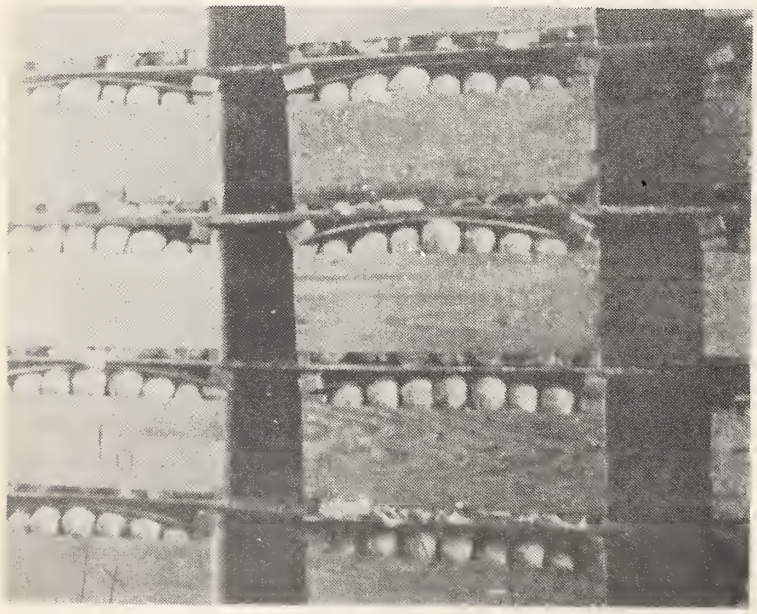

FIGURE 18. – Tomato lugs ranked in a railroad car ready for shipment to the United States. The shipper must purchase bracing material for the cars. Care must be taken to prevent the lugs from shifting around in the car and damaging the tomatoes.

Many of the cull tomatoes are hauled away and destroyed. Usually between 300 and 400 cars of loose tomatoes are shipped from the west coast to interior cities in Mexico. They carry about 30,000 pounds each, whereas those transporting packed lugs carry only about 20,000 or 25,000 pounds each. When a large portion of the crop can be sold, because of good

prices and strong demand in the United States, the proportion of culls sorted out is much less. When culls are shipped to interior points, the price received at the packing shed is about 5 cents per lug.

During the 1943-44 season some 50 carloads or more of tomatoes from the El Mante area were shipped to Texas by trucks. Many of these tomatoes were of poor quality, being mostly culls from the packing sheds. Just how much of this can be done in the future will depend upon demand and market requirements. Very likely grower organizations and inspectors at the border will prevent the movement of large quantities of poor-quality tomatoes. There was some complaint during the 1943-44 season that the sale of tomato culls from the El Mante area falsely advertised this area as producing and exporting a poor-quality product. United States buyers were skeptical of tomatoes coming from this region.

Although much of the work in packing tomatoes is done on a piece basis, sorting is usually paid for by the day or by the hour. If this job were paid for on a piece basis, it would likely be poorly done.

Costs and Returns

Costs are difficult to determine because of the variation in prices for labor, machinery, irrigation, insecticides, materials for packing, freight rates, and other items. Most of the figures reported are based on conditions prevailing during the past year or two, when costs were probably higher than they had been for a long time, or than they had ever been.

Growing and Harvesting Costs

The cost of producing tomatoes might be grouped largely according to operation, principally such as rent of land, cleaning and burning, plowing, disking, cross-plowing, floating or working down, marking, transplanting, cultivating, seeding and growing plants, hoeing, irrigating, dusting, picking and hauling to the packing shed, and other miscellaneous items. If detailed records were available, one might possibly classify the costs somewhat differently or into the factors making costs, such as man labor, horse labor, use of tractor, use of machinery, seed, cost of water, construction and maintenance of irrigation ditches, etc. Since estimates had to be made, they were less difficult when based on information available as to the different operations (tables 16, 17, 18, and 19).

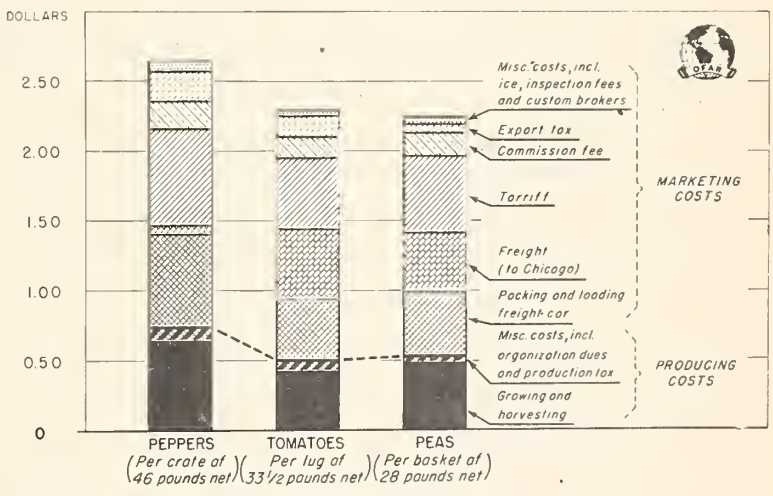

FIGURE 19. — Estimated production and marketing costs, per unit, of peppers, tomatoes, and peas for export from the west coast of Mexico.

Many of the cost items vary a great deal from one farm to another. For example, land rent may vary from $3.00 to $10.00 per

TABLE 16. – *Estimated cost of growing and harvesting tomatoes on the west coast of Mexico*[1]

ITEM OF COST	COST PER ACRE	COST PER LUG OF 33.5 LBS. NET
	U. S. dollars	*U. S. dollars*
Rent	4.50	0.045
Cleaning and burning (pro-rated)	.30	.003
Plowing	2.25	.022
Disking and cross-plowing	3.00	.030
Floating or leveling	.50	.005
Marking	.40	.004
Transplanting	.80	.008
Cultivations (5)	3.00	.030
Hoeings (1)	1.00	.010
Cost of irrigations	3.50	.035
Producing plants	3.00	.030
Dusting	3.00	.030
Picking and hauling to the packing shed[2]	15.00	.150
Miscellaneous	1.50	.015
Total cost of growing and harvesting	41.75	0.417

[1] These costs would also apply closely to the El Mante area in Tamaulipas.

[2] Figured on an average yield of 100 sorted lugs per acre.

Source: From personal interviews by the author with growers, commission men, buyers, and others connected with the vegetable industry.

TABLE 17. – *Estimated cost of packing tomatoes on the west coast of Mexico*

ITEM OF COST	COST PER CAR OF 750 LUGS	COST PER LUG OF 33.5 LBS. NET
	U. S. dollars	*U. S. dollars*
Box – (20 to 30 cents Mexican-made, 20 cents American-made)	150.00	0.200
Making lug	15.00	.020
Paper for wrapping – (if American is 10 cents per lug)	37.50	.050
Wrapping and packing	15.00	.020
Nails	15.00	.020
Labels, glue, ink, stamps, etc.	7.50	.010
Putting on tops	11.25	.015
Loading cars of 750 cases, sticks, nails, lumber, labor	30.00	.040
Labor in sorting, inspection, etc.	18.75	.025
Supervision and overhead expense	30.00	.040
Total cost of packing tomatoes	330.00	0.440

Source: From personal interviews by the author with growers, commission men, buyers, and others connected with the vegetable industry.

TABLE 18. – *Estimated cost of the marketing of tomatoes from the west coast of Mexico when sold at Chicago, Illinois*

COST ITEM	COST RATE	COST PER CAR OF 720 LUGS	COST PER LUG OF 33.5 LBS. NET
		U. S. dollars	*U. S. dollars*
Ice	8 tons at $1.40 per ton	11.20	0.0149
Freight	$1.487 per 100 lbs.	374.74	.4997
Tariff	$0.015 per pound at 25,125 pounds per car	376.88	.5125
Commission fee	$0.15 per lug	112.50	.1500
"Aforo" tax (export tax)	At 6.1¢ per lb. valuation and 40% exemption	110.02	.1467
Customs brokers	$3.00 U. S. and 75¢ per ton Mexican	12.42	.0166
Inspection fee	$4.00 per car	4.00	.0053
Miscellaneous (spotting car, demurrage, etc.)		5.00	.0067
Total cost of marketing		1,006.76	1.3524

Source: From personal interviews with growers, commission men, buyers, and others connected with the vegetable industry.

TABLE 19. – *Estimated costs and returns of growing and packing tomatoes on the west coast of Mexico and marketing them in Chicago, Illinois*

COST ITEM	COST PER CAR OF 750 LUGS	COST PER LUG OF 33.5 LBS. NET
	U. S. dollars	*U. S. dollars*
Cost of growing and harvesting	313.12	0.42
Cost of packing and loading freight car	330.00	.44
Production tax (varies by States)	22.50	.03
Dues to organizations - (only in Sinaloa)	37.50	.05
Cost of marketing	1,006.76	1.35
Total of all costs	1,709.88	2.29
Value at a price of $3.50 per lug in Chicago, Illinois	2,250.00	3.50
Total costs	1,709.88	2.29
Profit to grower	540.12	1.21

Source: From personal interviews with growers, commission men, buyers, and others connected with the vegetable industry.

acre. If the land is owned, the rent item would be replaced by interest on investment, taxes, and upkeep. Cleaning and burning of refuse on the land are only necessary, in most cases, when the land is first broken for cultivation. This expense is therefore distributed over a number of years. The amount of plowing, working of the soil, cultivating, and hoeing varies from one farm to another. The number of irrigations is from 1 to 10. There is a great difference in the number of dustings and the amount of insecticides used. The cost of the water for irrigation is usually quite uniform, about 75 cents per acre per year; but the cost of using the water varies a great deal with the amount of labor needed to apply it and the number of canals and ditches constructed on the land.

The cost of growing plants consists of such items as the cost of seed, man labor, power, machinery, dusting materials, and the use of land. Tomato seed in the 1943-44 season cost about $4.00 per pound.

The daily wage for labor in the 1943-44 season varied from about 50 cents to $1.00 for unskilled labor and was about $1.50 for special labor, such as for irrigating or for operating a tractor. The use of mules is figured at about 20 cents per day plus some pasturage. In general, labor does not seem to be so efficient as it is in United States producing areas. At least 20 or 30 days are spent at work on each acre of land to produce a crop of tomatoes. The cost per lug of tomatoes for picking and hauling to the packing shed is estimated to be from 12 to 20 cents per lug. The number of lugs picked per day varies from about 10 to 25. One grower calculated that an average of about 14 lugs was picked per day during the 1943-44 season but that in some previous years the daily average was as high as 22.

Packing Costs

The cost of the container represents nearly one-half the cost of packing a lug of tomatoes. In general, the cost of a lug has risen from around 14 or 15 cents for Mexican-made boxes to nearly twice that amount. The paper for wrapping is purchased in 20,000-sheet bundles at a cost of between $8.00 and $10.00. A keg of nails, weighing about 110 pounds, costs from $18.00 to $20.00. Part of the nails are supplied domestically, and part are imported. Labels from the United States cost about $6.00 for 1,000. Mexican labels do not stand up so well as those from the United States, according to some growers.

Considerable labor is involved in packing tomatoes. The sorting is paid for at the rate of about 10 to 12 cents per hour. The wage for individual wrapping and packing in the box is usually by the piece and averages about 2 cents per lug. The assembling of the lugs costs about 2.5 cents per lug on a piece basis. Putting on the tops is usually paid for by the piece at a rate of about 1.5 cents per lug. There is considerable supervision and overhead expense in packing, and the original cost of constructing the packing shed and office constitutes quite an item. The usual office supplies are commonly maintained. The total packing and loading costs are about the same, or even slightly more, than the total cost of growing and harvesting.

Costs of Marketing

The largest item in the cost of marketing tomatoes is the United States tariff of about 1.5 cents per pound. The next highest cost, which is almost equal to the tariff cost, is the freight from the producing area to the destination in the United States. Freight rates on the west coast from the area between the southern part of the State of Sinaloa and north of the region, where the vegetables are produced in

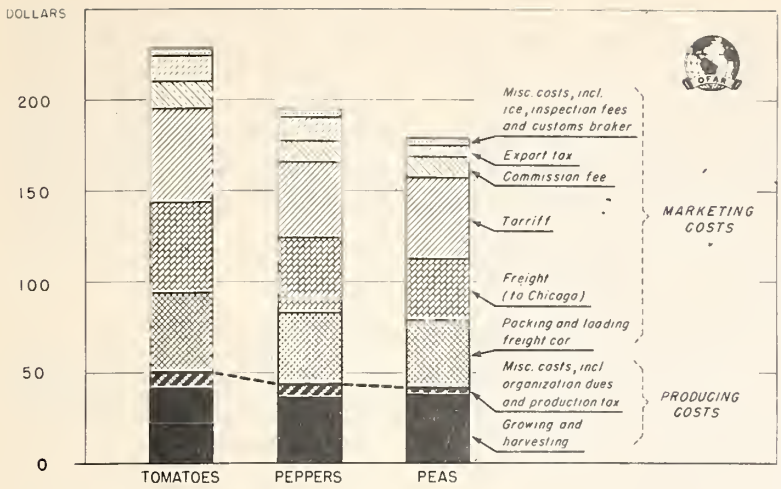

FIGURE 20. – Estimated production and marketing costs, per acre, of tomatoes, peppers, and peas for export from the west coast of Mexico.

the State of Sonora, are all the same. The rates in the United States and Canada vary, depending upon the areas into which the cars are sent. The freight rate to Chicago, the destination of probably the largest volume, is $1.49 per 100 pounds. Occasionally there are additional expenses, such as a charge of about $2.30 for spotting the car on a siding in Mexico. Demurrage costs begin on railroad cars after 24 hours on the Southern Pacific Railroad of Mexico at rates of $2.27 for 24 to 48 hours and $6.80 for each day over 48 hours.

The tariff rate and the export tax in Mexico have already been fully discussed. Marketing costs, including the tariff and export taxes, amount to about one-half or two-thirds of the total cost of placing tomatoes on the market in the United States or Canada. Contrary to the belief of some people, low costs of production in Mexico may not necessarily mean that Mexican tomatoes will compete seriously with tomatoes produced in the United States. As was stated before, the long haul, together with the high cost of taking the vegetables across the border to their destination, is the most limiting factor. Any change in the tariff rates, or in the export taxes, has a profound influence upon returns to producers in Mexico.

Total Costs and Returns

In addition to the three main cost items just discussed - growing and harvesting costs, packing costs, and marketing costs - there are some miscellaneous expenses which cannot be grouped under these headings. One of these is the State production tax which amounts to about 2 to 4 cents per lug, varying from one State to another. Dues to organizations represent another item of expense. In Sinaloa this amounts to about 5 cents per lug and is paid to the Confederation of Agricultural Associations of that State. There is no such expense in the State of Sonora or in the El Mante area of Tamaulipas. When all costs are added together (table 19), the estimated total per car of tomatoes, based upon 1943-44 season prices, is about $1,710.00, or $2.29 per lug, at Chicago, Illinois. These figures would be $37.50 less per car, or 5 cents less per lug, for the State of Sonora where no organization dues are charged. A producer whose costs came within these expenses would receive as profit the difference between $2.29 per lug and the selling price of the tomatoes. The estimates of growing and harvesting costs made here are based on an average yield of about 100 lugs of sorted tomatoes per acre. Yields of 250 or 300 lugs per acre have been obtained, as well as yields far below 100 lugs per acre.

If a grower had costs averaging $2.29 per lug and yields averaging 100 lugs per acre, the returns per acre, net profit, or for the grower's labor, would be about

$1.21 per lug, or around $121.00 per acre, at a price of $3.50 per lug, f.o.b. Chicago, Illinois. The returns for tomatoes in Mexico are highly uncertain. The price in the United States and Canada depends much upon the production in the United States and Cuba. When frosts damage the crops in these areas, or yields are low because of some other adverse factor, Mexican producers have a chance to sell their crop to an advantage. In the latter part of the season, when the competing areas have large crops, the Mexican shipper normally does not receive very high returns in shipping tomatoes to the United States.

PEPPERS

Methods of Producing, Harvesting, and Packing

The methods employed in the production of peppers are much like those used for producing tomatoes. Therefore, methods for producing peppers will not be discussed in detail in order to avoid a duplication of the discussion under tomatoes.

Varieties, Seed, and Production of Plants

The bell pepper is the most common type of pepper grown for export. A few Anelriem and Caribas chilies are also grown for export. Practically the only variety of bell pepper used is the California Wonder. Nearly all the seed is brought into the country by the large operators themselves or by marketing agencies, who wish to contract with producers, and who do this as a favor to the producers. Pepper seed for the 1943-44 season was about $8.00 per pound. The seed is sown in beds similar to those used for tomatoes.

FIGURE 21. — Setting pepper plants in the State of Sinaloa. They are set in furrows in which irrigation water was previously run.

Preparation of Soil in Fields

Since peppers are grown for export in about the same areas as tomatoes, both the time and the methods of preparing the soil are likewise practically the same. The soil is usually plowed and well worked down with disks, harrows, floats, and rollers. If producers would prepare their soil 2 or 3 months before the time to set the plants, they could control weeds better, but they seldom do this. One or two irrigations are made before the plants are transplanted.

Transplanting

The seedbeds for peppers are usually located

close to the fields in which they are later to be transplanted. The plants are carried by hand, usually in baskets, to that part of the field in which they are to be transplanted. The plants are generally about 6 inches in height at this stage. A furrow is usually made with a one-horse furrow plow; then irrigation water is run through the furrow, as with tomatoes, and is left to soak into the soil before transplanting. The distance between plants in the field is about one-half the distance allowed for tomatoes, or about 3 to 4 feet between rows and about 2 feet between plants. This spacing provides for around 5,000 plants per acre.

FIGURE 22. — Cultivating peppers with a small furrow plow, which forms the rows into ridges and so provides furrows between rows for irrigation. Note the absence of weeds.

Fertilizing and Manuring

Peppers are seldom, if ever, fertilized or manured. If they are fertilized, usually guano, or Chilean nitrate, is used.

Irrigation

Normally peppers receive from 5 to 10 irrigations, the same as tomatoes. One to three irrigations are made before the plants are set, two or three before harvesting, and several during the harvesting period between pickings.

Cultivation

The cultivation practices are virtually the same for peppers as for tomatoes, except that a mule and simple cultivator may be more often used with peppers, since the plants are set closer together.

Insects, Diseases, and Their Control

Probably the worst pest of peppers is the leaf roller *Platynota stultana* (Wlsm.). Some hand dusting with nicotine sulfate is done in order to control this pest. As far as is known, the airplane has not been used for dusting peppers, which are, in general, relatively free from diseases and insects. The floods and frosts that occur occasionally in the producing regions have been more harmful than either.

Harvesting

Peppers are harvested in almost the same manner as are tomatoes. They are likewise picked and shipped green. Usually it is necessary to pick the peppers about eight times. In general, the picking is done with greater care than in the case of

FIGURE 23. — A field of peppers in the Culiacán River Valley of the State of Sinaloa. Note the deep furrows between rows. The irrigation water flows into these furrows and soaks into the soil. This is a level alluvial plain.

tomatoes, and therefore less sorting is needed. The amount of labor involved in picking and hauling peppers is about the same as that for tomatoes. The greater part of the peppers are harvested in March and April. A few, however, are harvested and exported nearly every month of the year, largely by the smaller producing areas.

Packing

Arrangements and packing processes for peppers differ little from those for tomatoes. The pepper crates, usually made up at the packing shed from loose sawed lumber, hold about 46 pounds, and between 400 and 450 crates are packed in each car. Some sorting is done at the packing shed, but a much larger proportion, probably 60 to 85 percent, of the peppers harvested are packed. Peppers also are usually wrapped individually.

Costs and Returns for Pepper Production

The cost items for the production of peppers are practically the same as those for the production of tomatoes. Only a few differences need to be pointed out.

Costs of Growing and Harvesting

Preparation of the land for peppers is identical to that for tomatoes, except that more rows are marked off, because the plants are set closer together. Also, slightly more work is involved in transplanting. Since there is relatively less trouble with diseases and insects, peppers are not dusted so often as tomatoes, and, therefore, the expense for this item is less. In the calculations presented here as an example, a yield of 60 crates per acre was used. According to governmental statistics, average yields for the area are probably below this. The pepper crop seems to be more often reduced by unfavorable weather than the crop of tomatoes. Such losses influence the yield, and the average cost per crate of peppers may be much higher than indicated (tables 20, 21, 22, and 23).

Packing Costs

Likewise, the items in the cost of packing peppers are practically the same as those in packing tomatoes. Since the crates used for packing peppers are larger than those for tomatoes, the cost per crate is naturally higher. Nearly two-thirds the total cost of packing peppers consists of the original cost of the material for the

crate, assembling, and putting the top on at the packing shed. Allowing for the larger crate in which the peppers are packed, the cost per crate corresponds very closely with that of tomatoes. About 2 or 3 cents per crate is paid for wrapping and packing.

Costs of Marketing

In marketing peppers, the costs of ice, tariff, commission fees, brokers fees, inspection fee, and freight are all practically the same per car as for tomatoes. The commission fee charged is usually slightly higher, because there are fewer crates per car and the crates have a larger net weight. The aforo or export tax has not been greatly different from that on tomatoes, being sometimes higher and sometimes lower.

Total Costs and Returns

As in the case of tomatoes, a production tax is usually levied on peppers. This is a State tax and varies from one State to another from about 3 to 5 cents per crate. Also a large part of the peppers are produced in the State of Sinaloa where there are dues to organizations. These amount to about $31.50 per car and are paid to the Confederation of Agricultural Associations of the State of Sinaloa. There are no such expenses in the State of Sonora. The production tax in that State is, however, usually higher.

When costs are figured and added together for the example given, the cost per car totals about $1,461.00, and the cost per crate of peppers averages about $3.25, f.o.b. the market in Chicago, Illinois. Costs are much greater when the crop is considerably damaged by unfavorable weather, which is often the case. Yields of only half those estimated here might cause the total cost to be increased by $250.00 or $300.00 per car; thus, most of the profit would be completely eliminated. Total cost per crate is higher than the cost per lug of tomatoes, but the cost per pound is almost the same. As with tomatoes, a great deal depends upon the price and

FIGURE 24. — Sweet bell peppers of good quality are grown in Mexico for export to the United States.

TABLE 20. — *Estimated cost of growing and harvesting peppers on the west coast of Mexico*

ITEM OF COST	COST PER ACRE	COST PER CRATE OF 46 LBS. NET
	U. S. dollars	*U. S. dollars*
Rent of land	4.50	0.075
Cleaning and burning (pro-rated)	.30	.005
Plowing	2.25	.038
Disking and cross-plowing	3.00	.050
Floating or leveling	.50	.008
Marking	.40	.007
Transplanting	1.00	.017
Cultivations (3)	3.00	.050
Hoeings (1)	1.00	.017
Cost of irrigations	3.50	.058
Producing plants	3.00	.050
Dusting	1.50	.025
Picking and hauling to packing shed[1]	12.00	.200
Miscellaneous	1.50	.025
Total	37.45	0.625

[1] Figured on an average yield of 60 crates per acre.

Source: Personal interviews with growers, commission men, buyers, and others connected with the industry.

TABLE 21. — *Estimated cost of packing peppers on the west coast of Mexico*

ITEM OF COST	COST PER CAR OF 460 CRATES	COST PER CRATE OF 46 LBS. NET
	U. S. dollars	*U. S. dollars*
Crate (39¢ U. S. and about same for Mexican)	175.50	0.390
Making crates	11.25	.025
Paper for wrapping	6.00	.013
Wrapping and packing	9.00	.020
Nails	11.25	.025
Labels, glue, ink, stamps, etc	4.50	.010
Putting on tops	6.75	.015
Loading cars, lumber, labor	30.00	.067
Labor in sorting, inspection, packing, etc.	11.25	.025
Supervision and overhead expenses	30.00	.067
Total cost	295.50	0.657

Source: Personal interviews with growers, commission men, buyers, and others connected with the vegetable industry.

TABLE 22. – *Estimated cost of the marketing of peppers from the west coast of Mexico when sold at Chicago, Illinois*

COST ITEM	COST RATE	COST PER CAR OF 450 CRATES	COST PER CRATE OF 46 LBS. NET
		U. S. dollars	*U. S. dollars*
Ice	$1.40 per ton	11.20	0.025
Freight	About $1.487 per 100 lbs.	307.81	.684
Tariff	$0.015 per lb., 46 lbs. per box, and 20,700 lbs. per car	310.50	.690
Commission fee	$0.20 per crate	90.00	.200
Aforo tax (export tax)	At 6.45¢ per lb. valuation and 40% exemption	96.30	.214
Customs broker	$3.00 U. S. and about $0.75 per ton Mexican	10.76	.024
Inspection fee	$4.00 per car	4.00	.009
Miscellaneous (spotting car, demurrage, etc.		5.00	.011
Total cost of marketing		835.57	1,857

Source: Personal interviews with growers, commission men, buyers, and others connected with the industry.

TABLE 23. – *Estimated costs and returns of growing and packing peppers on the west coast of Mexico and marketing them in Chicago, Illinois*

ITEM	COST PER CAR OF 450 CRATES	COST PER CRATE OF 46 LBS. NET
	U. S. dollars	*U. S. dollars*
Cost of growing and harvesting	280.88	0.63
Cost of packing and loading freight car	295.50	.66
Production tax	18.00	.04
Dues to organizations (only in Sinaloa)	31.50	.07
Cost of marketing	835.57	1.86
Total costs	1,461.45	3.26
Value at price of $4.00 per crate in Chicago, Illinois	1,800.00	4.00
Total costs	1,461.45	3.26
Profit to grower	338.55	0.74

Source: Personal interviews with growers, commission men, buyers, and others connected with the vegetable industry.

demand situation in the United States. When there is a large supply on the market and prices fall below $3.00, it is almost impossible for Mexican producers to compete. As with tomatoes, the most important factor influencing competition, according to the Mexican pepper producer, is not the original cost of growing and harvesting, but rather the cost of packing, loading, and marketing. During the 1943-44 season, farmers were able to produce a crop of peppers and obtain fairly good returns, because the price was quite favorable. A considerable amount of the acreage, however, was damaged during the early part of the season by unfavorable weather.

PEAS

Methods of Producing, Harvesting, and Packing Peas

Even though peas are extensively produced in the States of Sonora and Sinaloa, where the largest part of tomatoes and peppers are also produced, the methods of production are quite different. Peas grow from seeds planted in the fields and do not have to be transplanted as do tomatoes and peppers.

Preparation of Soil in Fields

The soil is prepared at about the same time and in about the same way as for peppers and tomatoes. It is usually plowed in the fall of the year after most of the rains are over, and then it is worked down by disking, harrowing, etc. In most cases the land is irrigated once or twice before seeding. The soil where most of the peas are grown is lighter in some instances than the soil used for some other vegetables. It is relatively light in the Yaqui River Valley, where large acreages of peas were grown in 1943-44.

FIGURE 25. — Dusting peas with sulfur for mildew. The most common method of applying the dust is by shaking it through a gunny sack. Nicotine sulfate is applied principally for aphids.

The most common varieties of peas grown are the Hundredfold and Number 640. Practically all the seed is imported. Some of the growers use their own seed for 2 or 3 years and only import seed every second or third year. Seeding is usually done by a grain drill with some of the holes plugged. This is especially true in the Yaqui River Valley, where a considerable amount of small grain is grown, and grain drills are therefore available. In some cases, peas are seeded by hand. Between 35 and 60 pounds of seed are used per acre. More seed is sown of the Hundredfold variety than of Number 640. The rows are placed between 2 and 3 feet apart, and the plants in the row vary from about 6 inches to 1 foot apart. Peas are seeded on the west coast in the period October

December. It takes from 60 to 90 days for the peas to mature. They receive practically no fertilizer or manure.

FIGURE 26. — Picking peas in the Yaqui Valley of southern Sonora. Large crews of from 20 to 200 pickers are used. Nearly all the members of a family pick peas on a piecework basis.

Irrigation

The pea field is irrigated from 6 to 10 times each season, usually twice before seeding, twice before harvesting, and frequently during the picking season. Water may be applied entirely by gravity from canals leading from the source of supply, but for irrigating fields on higher ground it must be pumped. Some farms obtain irrigation water from wells.

Cultivation

Most of the cultivation of peas is with mules and a single-row cultivator. Some is also done with a tractor and a two- or three-row cultivator. Peas are usually cultivated from four to six times. Quite often some hoeing needs to be done.

Insects, Diseases, and Their Control

The most common insects affecting peas are aphids and the corn-ear worm. The most common disease is mildew. Nicotine dust or spray is applied for aphids, and sulfur dust for mildew. Dusting with sulfur is usually done three or four times, and with nicotine, only once. Sulfur is generally first used when the peas start to blossom. Some dusting was done by airplane during the 1942-43 and 1943-44 seasons. Ten to twenty pounds of dust, either of nicotine sulfate or sulfur, may be required per acre for application by hand and 5 to 10 pounds when an airplane is used. Occasionally nicotine sulfate is used in the form of a spray and is then applied by a small hand sprayer. Usually it is applied as a dust contained in a gunny sack which is shaken over the vines. Nearly all producers need to do some dusting in order to control mildew and aphids. Great difficulty has been experienced in getting nicotine sulfate during the war years, since all of it is imported from the United States.

Harvesting

Peas are picked about 10 or 12 times or about 1 or 2 times each week. The usual yield is about 1 ton per acre. Most any type of container is used in picking the peas, the most common being a 5-gallon tin oilcan. Picking is done mostly on a piece basis. The rate of pay in 1943-44 was about 5 cents for 15 pounds. One person picks from 200 to 600 pounds per day. Men, women, and children of all ages do the picking. Most of the peas are hauled to the packing shed, which is usually close to the railroad track, to be sorted and packed.

Packing

Peas are packed unshelled in 28-pound baskets for export. They are sorted and packed in the usual type of packing shed by women. About 20 to 40 percent of the peas picked are culled out for discard or use as livestock feed. Sorting and packing are almost always paid for by the hour rather then on a piece basis. Usually the peas are not arranged in any particular way in the baskets, although sometimes they are faced on the top. From 576 to 720 baskets are loaded in each railroad car, and crushed ice is placed around and over the baskets. This is necessary in order to refrigerate the peas enough for transit to the border. The grower usually maintains some kind of an ice crusher at the loading point.

FIGURE 27. — A shed for packing peas in Sonora. Various types of materials are used for constructing packing sheds, such as lumber, brush, and fiber matting. This shed is constructed of fiber matting.

Costs and Returns for Pea Production

Since the methods of cultivation and production for peas are quite different from those for tomatoes and peppers, the cost items are also somewhat different. In general, however, costs per acre and per car average about the same for all three vegetables.

Cost of Growing and Harvesting

Preparations for seeding cost practically the same for peas as for peppers and tomatoes. There is no cost of producing plants to be transplanted, but this is offset to some extent by the cost of the seed and seeding operations in the field. Peas are cultivated four or five times; consequently, the cost of cultivating and hoeing is about the same as for tomatoes and peppers. A considerable amount of irrigation is done, equally as much as for tomatoes, and sometimes more. Since there is considerable trouble with diseases and insects, the purchase and application of insecticides constitute one of the larger expense items. One of the dusts or sprays commonly needed is nicotine sulfate, which when imported from the United States in the 1943-44 season cost about $30.00 per 100 pounds. Picking and hauling the peas to the packing shed usually cost about 15 cents per sorted basket.

Packing Costs

Fewer operations are involved in packing peas than in packing tomatoes or peppers. Boxes do not have to be made, and there is no piecework, such as making the boxes and putting on the tops. The cost of baskets has been varying from 28 to 32 cents per basket. In 1943-44, however, some of the growers reported that they paid as much as 40 cents per basket at the packing shed. Slightly more work is involved in loading the cars because of icing the baskets. Women working at sorting and packing peas

earned from 75 cents to $1.00 per day during the 1943-44 harvest. The number of baskets per car in recent years has been higher on the average than in earlier years because of the difficulties in transportation and the scarcity of cars. The calculation of these costs was based upon the heavy loading of cars (tables 24-27).

TABLE 24.– *Estimated cost of growing and harvesting peas on the west coast of Mexico*

ITEM OF COST	COST PER ACRE	COST PER BASKET OF 28 POUNDS
	U. S. dollars	*U. S. dollars*
Rent	4.50	0.056
Cleaning and burning (pro-rated)	.30	.004
Plowing	2.25	.028
Disking and cross-plowing	3.00	.038
Floating or leveling	.50	.006
Seed	3.00	.038
Seeding	.60	.008
Cultivations (4 or 5)	3.00	.038
Hoeings	1.00	.012
Irrigations	3.50	.044
Dusting or spraying	3.00	.038
Picking and hauling to packing shed[1]	12.00	.150
Miscellaneous	1.50	.019
Total cost of growing and harvesting	38.15	0.479

[1] Figured on an average yield of 80 baskets per acre.

Source: Personal interviews with growers, commission men, buyers, and others connected with the industry.

TABLE 25. – *Estimated cost of packing peas on the west coast of Mexico*

ITEM OF COST	COST PER CAR OF 720 BASKETS	COST PER BASKET OF 28 POUNDS
	U. S. dollars	*U. S. dollars*
Basket	252.00	0.35
Sorting and packing	21.60	.03
Labels, glue, ink, stamps, etc.	7.20	.01
Loading cars, icing, nails, lumber, labor	28.80	.04
Supervision and overhead	28.80	.04
Total cost of packing peas	338.40	0.47

Source: Personal interviews with growers, commission men, buyers, and others connected with the industry.

TABLE 26. – *Estimated cost of marketing of peas from the west coast of Mexico when sold at Chicago, Illinois*

COST ITEM	COST RATE	COST PER CAR OF 720 BASKETS	COST PER BASKET OF 28 POUNDS
		U. S. dollars	*U. S. dollars*
Ice	$1.40 per ton at 11 tons	15.40	0.021
Freight	$1.487 per 100 lbs.	300.37	.417
Tariff	2¢ per lb. and 20,160 lbs.	403.20	.560
Commission fee	$0.15 per basket	108.00	.150
Aforo tax (export tax)	At 3.65¢ per lb. valuation and 40% exemption	52.92	.074
Customs brokers	$3.00 U. S. at 75¢ ton Mexican	10.56	.015
Inspection fee		4.00	.006
Miscellaneous (spotting car, demurrage, etc.)		5.00	.007
Total cost of marketing		899.45	1.250

Source: Personal interviews with growers, commission men, buyers, and others connected with the industry.

TABLE 27. – *Estimated costs and returns of growing and packing peas on the west coast of Mexico and marketing them in Chicago, Illinois*

ITEM	COST PER CAR OF 720 BASKETS	COST PER BASKET OF 28 POUNDS
	U. S. dollars	*U. S. dollars*
Cost of growing and harvesting	343.35	0.48
Cost of packing and loading freight car	338.40	.47
Production tax	28.80	.04
Dues to organizations		
Cost of marketing	899.45	1.25
Total of all costs	1,610.00	2.24
Value at a price of $2.75 per basket in Chicago, Illinois	1,980.00	2.75
Total costs	1,610.00	2.24
Profit to grower	370.00	0.51

Source: Personal interviews with growers, commission men, buyers, and others connected with the industry.

Costs of Marketing

Among the marketing costs for peas, freight, commission fee, customs brokers' fees, and inspection fees average about the same per car as for tomatoes. More ice is used in pea cars, because the bunkers are filled and crushed ice is put over the baskets in the cars. Usually a total of about 11 tons is used per car. The United States tariff rate, 2 cents per pound for peas, is slightly higher than for peppers and tomatoes. The valuation under the aforo or export tax during the latter part of 1943-44 was only about one-half to slightly over one-half the valuation placed upon tomatoes and peppers.

Total Costs and Returns

As for peppers and tomatoes, a production tax is usually levied on peas. This amounts to from 2 to 4 cents per pound. (For details of the application of this tax, see table 9.) Most of the peas are produced in the State of Sonora, where no dues are paid to organizations. Those which are produced in the State of Sinaloa are subject to dues for the Confederation of Agricultural Associations of the State, amounting to about $31.50 per car.

By far the largest cost item to be considered when producing peas for export is marketing. Again the most influential factor in determining whether or not Mexican peas can compete with peas produced in the United States is the cost of marketing and not necessarily the cost of growing and harvesting. A change in the United States tariff rate, or the export tax in Mexico, makes a considerable difference in the total cost.

Apparently the production and marketing of peas cost between $2.00 to $2.50 per basket. When the price in the United States approaches this figure, producers operate on a close margin, and enthusiasm about production is not great. Of course, yields vary considerably, and when they can be doubled from the 80 baskets per acre estimated in the example given here, it means much higher labor returns and more profit to the grower.

OTHER VEGETABLES

Since the production, harvesting, and exporting of other vegetables and truck crops in Mexico are relatively unimportant as compared with the production and exporting of tomatoes, peppers, and peas, only a limited amount of discussion will be given to them. In general, the usual methods of production followed in the United States for these crops are used in Mexico. In some cases, the cultural practices are not so strictly followed as they should be, and considerable improvement could be made, especially to get products of better quality.

Eggplant

The cultivation of eggplant is practically the same as that of tomatoes. The seed is sown in a seed plot 8 or 10 weeks before the plants are to be ready for setting in the field. The plants are transplanted when they are about 6 inches in height. They are set 2 feet apart in the row, and the rows are from 3 to 5 feet apart. Since they are usually set in rather small fields of not more than 4 or 5 acres, nearly all the work is done by hand. They are cultivated from three to six times and are hoed once or twice. Practically no fertilizing or manuring is done, although the plants

FIGURE 28. — Eggplants growing in the Del Fuerte River Valley of the State of Sinaloa. This field had recently been irrigated. The rows vary from 3 to 5 feet apart.

would probably respond well to fertilization. On the west coast, where most of the eggplant are grown, the time of transplanting corresponds with that of tomatoes and harvesting takes place during February, March, and April.

Harvesting operations require considerable care. When the fruit is bruised, it deteriorates rapidly. It is picked from 5 to 8 times at intervals of about 2 weeks. The fruit is cut from the plant and carried to the packing shed. Each individual fruit is wrapped in paper and carefully placed in crates that are similar to pepper crates. The crates vary in weight from about 45 to 60 pounds. A full car carries from 400 to 450 crates, but, since this vegetable is produced in small quantities, a few crates of eggplant are often shipped with other vegetables.

String Beans

The cultivation of string beans is more nearly like that of peas than of the other vegetables. Provided there are no frosts, they seem to grow well in almost any spot where the soil is reasonably good and water plentiful. They are seeded in rows 2 to 3 feet apart. Some hoeing is commonly done in the early stages of growth, and they are cultivated three or four times with a mule and a small cultivator. These beans, as with most other beans, are fairly easy to grow and require almost no fertilizing. Production has been seriously disrupted, however, during the past 2 years, especially in the large producing area in the States of Sonora and Sinaloa, because an insect relatively new to Mexico was found by inspectors at the port of Nogales in the season 1942-43. This was the bean-pod borer (*Epinotia opposita* Heinr.). When this insect was found, the vegetables were rejected and large losses experienced. At the present time, many growers consider the risk too high in producing string beans. A disease of string beans which spots the pod, anthracnose (*Colletotrichum lindemuthianum*), while not widespread, has occasionally ruined an otherwise marketable crop. Beans are picked in much the same way as peas and are packed in baskets of about 28 pounds each. When full carloads are shipped, from 650 to 750 baskets are put in one car. Many of the string beans are produced in small quantities, however, and are shipped in cars with other vegetables.

Onions and Garlic

The usual established practices are followed in producing onions and garlic in Mexico, but no detailed survey has been made of them. Most of the onions produced in Mexico are of the European type. Two common varieties are Crystal Wax and Spanish or

Valencia. Probably from 80 to 90 percent of the garlic crop is of the purple variety. Onion seed is usually sown directly in the field, but a large part of the garlic is started by setting out the small bulblets. Fertilizer is seldom used. Considerable work is involved in keeping the fields weeded, most of which is done by hand. Onions and garlic are normally packed in 110-pound sacks. When exported, they must be repacked in 50-pound sacks in order to meet United States market practices.

Cantaloups and Watermelons

The usual established United States practices are likewise followed in the production of cantaloups and watermelons in Mexico. The planting of these crops usually takes place later than that of tomatoes, peppers, and peas - about January or February, and even in March - so that the crops are harvested from April to July. Sometimes, especially for cantaloups, seedbeds are made, and the plants are transplanted. In most cases, the farmer sows the seed directly in the field. When these crops are exported, they are usually packed according to United States grades. The cars of cantaloups are iced as in the case of peas, but cars of cantaloups require larger amounts of crushed ice, frequently as much as 14 tons per car.

MARKETING METHODS

The most highly developed system of marketing is at the port of Nogales, through which pass by far the greater proportion of the vegetables exported from Mexico to the United States and Canada. Both buyers and sellers are contacted easily at this point, although the sales consist largely of tomatoes, peas, and peppers. The sales of cantaloups, watermelons, onions, and garlic are usually made before the products leave the producing areas. Most of the detailed information given on methods of marketing will relate to the system followed at the port of Nogales.

Transporting to the Border

When a grower expects to have vegetables ready for shipment, he orders cars from the railroad to be set on a siding for him. This order may be placed by the commission dealer if the exports are handled through a commission firm. The exporter keeps the station agent informed as to when he would like to have the cars moved to the border. It usually takes from 24 to 48 hours, depending upon the distance, for the cars to reach the border.

FIGURE 29. — A United States buyer inspects a car of fresh Mexican vegetables at Nogales, Sonora.

FIGURE 30. — Putting ice in the bunkers of empty cars at Empalme, Sonora, where there is an ice-making plant. More ice will probably be added to these cars at this place when they return full of vegetables.

During the first part of the season, or in the months from November to January, the cars require little icing because the temperature is cool enough to prevent spoilage. Cars from the west coast are iced in the middle and latter part of the season. The railroad loads the ice on the car at Empalme, a station about 255 miles south of Nogales. This is a good location, because it is from this place southward that vegetables are produced in the river valleys. Until 1944, the Southern Pacific Railroad of Mexico owned an ice plant in the railroad yards at Empalme. This plant was able to produce from 115 to 120 tons per day. Additions have been made to the plant, however, and the capacity has been doubled. Also, adjoining the plant, there is storage space for some 9,000 tons of ice. This ice-making plant has been taken over by an organization connected with the City Ice and Fuel Company of Chicago.

As empty cars for vegetables move southward, they are stopped at Empalme, and ice is put in the bunkers. Extra ice is taken on if the cars are to be used for peas and cantaloups. About 5 or 5.5 tons of ice are put in the bunkers on the way down. When the loaded cars of tomatoes or peppers move back toward the border, they are stopped again at this point and from 2.5 to 3 tons of ice are added to the bunkers. The ice for peas and cantaloups is crushed by the shipper at the loading point. Additional ice may also be put in the bunkers of the cars of peas and cantaloups on their way to the border. The most common type of refrigeration is the so-called standard refrigeration. This means that the car is precooled and when loaded travels with no vents open and with the plugs out for drainage. Requests by shippers regarding the handling of cars vary a great deal. Exactly which method is best does not seem to be well established or agreed upon by the shippers.

In the past few years, the Southern Pacific Railroad Company has needed to import ice. In 1942-43, approximately 50,000 tons of ice were used, and nearly half this had to be imported. The hope is that, with the additional capacity of the ice plant at Empalme, little or no ice will need to be imported in the future.

The ice is paid for by the exporter at a rate of $1.30 to $1.50 per ton, depending upon the destination of the cars. The total amount of ice used per car is about 8 tons for tomatoes, peppers, and mixed vegetables, 11 tons for peas, and about 14 tons for cantaloups.

Commission Firms

Some exporters arrange with a commission firm to take care of selling the vegetables and clearance at the border. Others have an office at the border and take care of their own commodities. The offices and commission firms established at the border are usually able to do a better job of marketing than an individual grower who has had no experience, because such firms are in a position to have contacts with buyers in many of the large wholesale markets in the United States and Canada. When these firms deal on a regular commission basis, the usual charge is from 10 to 15 cents per lug of tomatoes or basket of peas. Sometimes the charge is slightly more for peppers or eggplant. The commission usually amounts to about the same per car. The person in the producing area who is responsible for shipping the vegetables notifies his representatives immediately that such cars of vegetables have been started to the border. The commission dealer, or representative, at the border then makes plans for the arrival of the cars.

Customs Brokers

In most cases the exporter has long-time, established business connections with certain customs brokers. He must work through one customs broker on the Mexican side of the border and another on the United States side. Each morning during the harvesting season, these brokers are notified by the railroad company of the arrival of vegetable cars on the Mexican side of the border. They hire a group of workers, boys and men, to open the cars and to prepare them for inspection. These workers have a ladder which they use to assist the buyers, inspectors, and other representatives in entering and inspecting the cars. They receive tips from these people for the assistance they lend and for the use of their ladder. These same workers prepare and close the cars for crossing the border. The shipping documents are all turned over to the customs brokers, who prepare the proper customs forms. These customs brokers pay all the fees, and the tariff if it is to be paid at Nogales, or they place the shipment in bond to cover the tariff until it is cleared through some other customhouse in the United States or Canada. They take the entire responsibility for moving the products across the border. The fee for the Mexican broker is 83 cents per ton, and for the American broker it is about $3.00 per car.

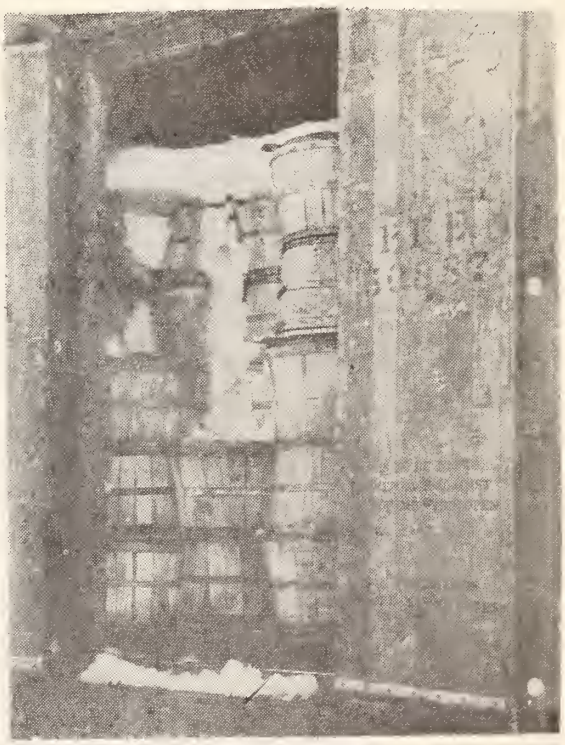

FIGURE 31. — Greater expense for ice is incurred for shipping peas, because crushed ice is placed over the baskets. This car has been opened for inspection at Nogales, Sonora.

The weighing of vegetables is now under the supervision of the International Freight Bureau. Starting with the 1943-44 season, this Bureau recognized the weights of the Southern Pacific Railroad of Mexico. Formerly 10 containers were weighed at the border in order to get an average net weight for the car, upon which the customs fees and taxes were based.

United States Department of Agriculture Inspection Service

Every morning during the exporting season inspectors of the Department's Bureau of Entomology and Plant Quarantine go to the railroad yards on the Mexican side of the border to inspect the vegetables. This inspection is for the protection of the United States. If certain insects or diseases which prohibit their entrance into the United States are found on the vegetables, the cars are rejected. Usually a number of the vegetable containers are examined thoroughly. Some vegetables may even be cut open in order to check on certain diseases and insects. Tomatoes are usually inspected inside the car. Containers of such vegetables as peas are often removed from the car for inspection.

At the present time, representatives of the Production and Marketing Administration also inspect the vegetables at the border. The inspectors were formerly agricultural-college graduates, but those doing the inspecting recently had received only a few months' special training for the job. They prepare a special report as to condition and grade of the contents of the car, which is given to the exporter, commission firm, or representative. The main purpose of this inspection is to render service to the buyers and sellers of the vegetables. During the 1942-43 season the charge for inspection was $3.50 per car; in the 1943-44 season it was $4.00 per car. All the expenses and salaries of the inspectors are paid from these fees. Formerly, the charge was just enough to cover expenses; any surplus collected was returned to the shippers. This was not considered fair, because the rebate went to the shippers and not necessarily to the growers who originally paid the expenses. At the present time, the fees collected are put into a fund. When this fund gets low, the inspection fee may be increased; when it becomes large, the fee may be reduced. (For examples of

FIGURE 39. — A representative of the Bureau of Entomology and Plant Quarantine inspecting tomatoes at Nogales, Sonora.

inspection certificates or reports prepared by this group of inspectors for tomatoes, peppers, and peas, see Appendix.)

Sales and claims by buyers and sellers are made almost entirely on the basis of these certificates. In general, United States grades and standards are used, the report giving the percentage of containers conforming to the United States grade. The certificates usually contain such items as the number of containers in the car, description of the label, how the car is loaded, how the car is packed, size and uniformity of size of product, and the quality and condition of shipment. For tomatoes, usually the percentages that are mature, green, and turning are given. Also, the percentage of defects, such as puffiness, bruises, frost damage, scars, worm injury, deformities, etc., is indicated. A similar description is given also for peppers. Peas are described as to freshness, tenderness, firmness, color of pods, and the percentage of defects. The defects of peas usually are freezing injury, worm damage, thrips scars, decay, and the like.

FIGURE 33. — An inspector of the United States Agricultural Marketing Service at Nogales, Sonora. He examines the vegetables closely and makes out an inspection certificate which is used as a basis for selling the vegetables.

Selling

When the demand for Mexican vegetables is strong, many so-called cash customers come to Nogales to look at the incoming cars and to make purchases quickly. On the other hand, when the demand for winter vegetables is weak in the United States and Canada, few cash customers come to Nogales, and the exporters and commission firms or representatives must rely upon their long-distance contacts with buyers. Probably less than one-half the sales are to cash customers. Many of the vegetables are sold by telephone or by telegraph. Often buyers wire to the commission dealers, indicating what they want and accept or reject offers.

Sometimes the vegetables are not sold until after they have been moved to some point in the United States. For example, a car might be directed to Toronto, Canada, with the privilege of diversion or detention. Then it might be stopped at some city along the way and there inspected by a prospective buyer. It might be sold at this stop or it might be sent on toward Toronto. The number of stops has been limited to two in the last few years because of crowded transportation conditions. The commission man sees that duty, customs broker's charge, the aforo tax, and freight are paid; takes out his own expenses and commission; and returns the remainder to the grower.

In transit from shipping point to destination, the temperature in the refrigerator cars is regulated so as to control the ripening of tomatoes. When the tomatoes leave the producing area, they are completely green; by the time they reach the market, they have often ripened. The destination of the vegetables depends a great deal upon market conditions in the various localities of the United States or Canada. Vegetables from Mexico have moved to nearly all parts of the United States. Some go to the west coast, some to the central part of the country, and some even to the east coast. The largest market is probably in the central part of the United States.

PROCESSING VEGETABLES

Estimates indicate that in all there are some 30 canning factories in Mexico. A number of these are located in the central part of the country in or near the larger cities, such as Mexico City, Monterrey, and Puebla. Others are located in some of the vegetable-producing areas, such as those in the State of Guanajuato and the State of Veracruz. A number of these factories produce canned vegetables and are exporting small quantities to the United States.

Few vegetables are processed on the west coast of Mexico. A canning factory operated by a company called "Del Fuerte" is located at Los Mochis in the State of Sinaloa and has been operating for a number of years. Until 1943, this canning factory was quite small. Since then its capacity has been increased considerably. While recent statistics are not available on the pack, in 1942 about 22,258 cases (48 cans to a case) of tomatoes or tomato products were produced, 3,703 cases of peas, 1,908 cases of string beans, 172 cases of hot peppers, and 2,083 cases of pineapple. Undoubtedly, the pack during 1943 was larger than that of 1942. This company also cans shrimp during the off season. The "Del Fuerte" company has a growing organization separate from the canning factory. Most of the vegetables canned are contracted for in advance. Contrary to the opinion of many, it is difficult to depend entirely upon cull tomatoes for canning. A special variety of pea is grown for canning, namely, the Perfection.

FIGURE 34. — A field of Perfection peas grown primarily for canning in the Del Fuerte Valley, Sinaloa.

Another canning factory was constructed during the 1943-44 season, but it was completed too late to operate at full capacity during the 1943-44 harvest. It is located in the central part of the State of Sinaloa at the town of Culiacán. Tomato paste is expected to be the principal product of

this factory, which has the capacity to handle about 150 to 200 tons of tomatoes per day. Probably a considerable amount of this pack will be sold in the United States.

There has been considerable discussion about the possibility of establishing other canning factories and dehydration plants in the areas that produce fresh vegetables for export. Some think that the cull vegetables, as well as any others not exported, could be used. Most people who have investigated these possibilities have concluded that the use of the culls in such a manner would not be very remunerative. These regions, however, constitute potential areas for the construction of canning factories, because vegetables can be produced to advantage.

FIGURE 35. — When insects and diseases attack vegetables, such as these peas, growers go to considerable expense to control them. The man to the left is using a small hand sprayer; the one to the right, a torch made of a stick and corncob soaked in kerosene.

As far as is known, only one company is dehydrating vegetables mentioned in this report. It was started in 1943 and is handling onions and garlic. When full capacity of production is attained, it may be nearly 1,000 tons per year. Consideration has been given to the establishment of other plants for the dehydration of vegetables, but to date little has materialized in this direction. Plants now dehydrating bananas may endeavor to use vegetables in the future.

ORGANIZATION

About the only organization connected with the vegetable industry is the Confederation of Agricultural Associations of the State of Sinaloa on the west coast. This Confederation assesses each producer of vegetables about 5 cents per lug for tomatoes and an equivalent amount for other vegetables that are exported or shipped. It has attempted to assist the industry in various ways. In the past 2 years, in order to encourage the production of good-quality products, it has done some inspecting at the border. It has also tried to control shipments so that only high-quality products are exported. During the harvest season of 1943-44, it started to issue irregularly a publication called *Boletin Agrícola*. This publication gives such news as the comparisons of carload arrivals of vegetables at the port of Nogales during the current season with those of the year previous. It also lists prices for most of the vegetables and contains some general information and comments on the market situation. Occasionally, this *Boletin* acts as a news letter. It is undoubtedly of valuable service to the producers. The confederation lends assistance to growers in

obtaining such materials as containers. Similar organizations located in other States where vegetables are produced for export have not taken much interest in the vegetable industry.

In the new area of southern Tamaulipas, the Department of Agriculture through its semi-independent organization, the Ejidal Bank (*Banco Nacional de Crédito Ejidal*), has taken considerable interest in organizing the *ejidatarios* for producing and marketing tomatoes. Considerable financial assistance is rendered. Methods of marketing are taught, and assistance in obtaining materials is given. Small farmers and ejidatarios need some influential organization such as this to help them in obtaining containers, refrigerator cars, seed, and other supplies. There was some attempt at organizing an association in this area in the 1943-44 season.

APPENDIX

TABLE 1. – *Area, yield, and production of tomatoes in Mexico, by States, 1945-46*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
Coahuila	1,502	7,957	11,951
Chihuahua	877	4,022	3,527
Durango	1,631	7,261	11,843
Nuevo León	608	5,316	3,232
San Luis Potosí	2,286	6,885	15,739
Tamaulipas	7,784	5,318	41,394
Zacatecas	568	4,217	2,395
Total	15,256	5,905	90,081
GULF:			
Campeche	183	3,109	569
Quintana Roo	5	4,400	22
Tabasco	183	4,251	778
Veracruz	4,304	4,059	17,469
Yucatán	729	4,370	3,186
Total	5,404	4,075	22,024
PACIFIC NORTH:			
Baja California (T. Norte)	338	6,133	2,073
Baja California (T. Sur)	67	4,776	320
Nayarit	1,305	4,286	5,593
Sinaloa	30,027	5,448	163,581
Sonora	12,454	4,351	54,189
Total	44,191	5,109	225,756
PACIFIC SOUTH:			
Colima	284	3,401	966
Chiapas	643	3,336	2,145
Guerrero	2,412	3,350	8,080
Oaxaca	1,265	3,456	4,372
Total	4,604	3,380	15,563
CENTRAL:			
Aguascalientes	741	6,545	4,850
Distrito Federal	104	4,413	459
Guanajuato	5,468	5,786	31,636
Hidalgo	4,406	5,435	23,947
Jalisco	3,655	3,938	14,392
Mexico	1,011	3,670	3,710
Michoacán	4,188	4,243	17,771
Morelos	4,729	4,355	20,593
Puebla	3,034	4,565	13,849
Querétaro	2,338	3,282	7,674
Tlaxcala	25	2,920	73
Total	29,699	4,679	138,954
GRAND TOTAL	99,154	4,966	492,378

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 2. – *Area, yield, and production of peppers in Mexico, by States, 1943-44*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
Coahuila	867	2,113	1,832
Chihuahua	922	1,757	1,620
Durango	1,705	1,815	3,095
Nuevo León	64	1,516	97
San Luis Potosí	1,181	1,908	2,253
Tamaulipas	942	2,638	2,485
Zacatecas	954	1,535	1,464
Total	6,635	1,936	12,846
GULF:			
Campeche	30	1,833	55
Quintana Roo	22	1,500	33
Tabasco	52	2,000	104
Veracruz	6,162	1,972	12,154
Yucatán	398	1,523	606
Total	6,664	1,944	12,952
PACIFIC NORTH:			
Baja California (T. Norte)	618	4,388	2,712
Baja California (T. Sur)	10	2,000	20
Nayarit	1,954	1,884	3,682
Sinaloa	3,410	2,450	8,355
Sonora	986	2,070	2,041
Total	6,978	2,409	16,810
PACIFIC SOUTH:			
Colima	10	1,300	13
Chiapas	259	1,506	390
Guerrero	670	1,925	1,290
Oaxaca	1,838	1,546	2,842
Total	2,777	1,633	4,535
CENTRAL:			
Aguascalientes	1,013	2,499	2,531
Distrito Federal	161	1,783	287
Guanajuato	3,200	2,520	8,065
Hidalgo	1,310	1,886	2,471
Jalisco	1,213	1,806	2,191
Mexico	343	1,735	595
Michoacán	1,656	1,627	2,694
Morelos	260	1,942	505
Puebla	3,719	1,305	4,852
Querétaro	232	2,099	487
Tlaxcala	96	1,677	161
Total	13,203	1,881	24,839
GRAND TOTAL	36,257	1,985	71,982

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 3. – *Area, yield, and production of peas, in pod, in Mexico, by States, 1945-46*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
Coahuila	49	1,041	51
Chihuahua	791	814	644
Durango	180	1,000	180
Nuevo León	40	875	35
San Luis Potosí	230	1,035	238
Tamaulipas	482	934	450
Zacatecas	296	1,081	320
Total	2,068	927	1,918
GULF:			
Campeche	10	1,100	11
Tabasco	15	1,067	16
Veracruz	235	966	227
Yucatán	37	1,000	37
Total	297	980	291
PACIFIC NORTH:			
Baja California (T. Norte)	89	1,281	114
Baja California (T. Sur)	42	1,214	51
Nayarit	648	1,037	672
Sinaloa	1,082	1,145	1,239
Sonora	8,090	1,092	8,832
Total	9,951	1,096	10,908
PACIFIC SOUTH:			
Chiapas	109	1,073	117
Guerrero	29	1,138	33
Oaxaca	420	933	392
Total	558	971	542
CENTRAL:			
Aguascalientes	59	1,119	66
Distrito Federal	1,309	1,078	1,411
Guanajuato	1,142	1,021	1,166
Hidalgo	368	976	359
Jalisco	593	1,025	608
Mexico	1,527	1,028	1,569
Michoacán	477	1,170	558
Morelos	30	1,233	37
Puebla	4,460	1,008	4,497
Querétaro	193	995	192
Tlaxcala	430	898	386
Total	10,588	1,025	10,849
GRAND TOTAL	23,462	1,045	24,508

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 4. – *Area, yield, and production of string beans in Mexico, by States, 1944-45*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
Coahuila	190	1,053	200
Chihuahua	84	1,107	93
Durango	49	1,082	53
Nuevo León	42	1,429	60
San Luis Potosí	306	1,317	403
Tamaulipas	141	1,234	174
Zacatecas	198	1,126	223
Total	1,010	1,194	1,206
GULF:			
Campeche	25	1,160	29
Veracruz	504	1,232	621
Total	529	1,229	650
PACIFIC NORTH:			
Baja California (T. Norte)	74	1,905	141
Baja California (T. Sur)	7	1,286	9
Nayarit	114	1,588	181
Sinaloa	605	1,440	871
Sonora	2,041	1,541	3,146
Total	2,841	1,530	4,348
PACIFIC SOUTH:			
Chiapas	166	1,127	187
Guerrero	242	1,157	280
Oaxaca	776	1,097	851
Total	1,184	1,113	1,318
CENTRAL:			
Aguascalientes	42	952	40
Distrito Federal	820	1,248	1,023
Guanajuato	153	1,444	221
Hidalgo	247	1,275	315
Jalisco	321	1,224	393
Mexico	218	1,064	232
Michoacán	262	1,195	313
Morelos	218	1,275	278
Puebla	442	1,353	598
Querétaro	25	1,240	31
Total	2,748	1,253	3,444
GRAND TOTAL	8,312	1,319	10,966

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 5. – *Area, yield, and production of onions in Mexico, by States, 1944-45*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
Coahuila	326	3,279	1,069
Chihuahua	445	2,587	1,151
Durango	487	2,815	1,371
Nuevo León	316	3,307	1,045
San Luis Potosí	744	3,784	2,815
Tamaulipas	707	3,992	2,822
Zacatecas	1,430	2,334	3,338
Total	4,455	3,055	13,611
GULF:			
Campeche	82	2,122	174
Quintana Roo	25	3,160	79
Tabasco	165	2,661	439
Veracruz	190	2,505	476
Yucatán	148	2,473	366
Total	610	2,515	1,534
PACIFIC NORTH:			
Baja California (T. Norte)	74	4,027	298
Baja California (T. Sur)	42	3,405	143
Nayarit	380	3,371	1,281
Sinaloa	660	2,745	1,812
Sonora	707	3,693	2,611
Total	1,863	3,298	6,145
PACIFIC SOUTH:			
Chiapas	255	2,384	608
Guerrero	378	3,045	1,151
Oaxaca	262	2,466	646
Total	895	2,687	2,405
CENTRAL:			
Aguascalientes	287	1,812	520
Distrito Federal	116	4,526	525
Guanajuato	1,386	5,196	7,202
Hidalgo	640	2,852	1,825
Jalisco	2,767	3,389	9,378
Mexico	566	3,431	1,942
Michoacán	4,154	2,956	12,280
Morelos	620	4,061	2,518
Puebla	670	2,294	1,537
Querétaro	203	2,995	608
Tlaxcala	170	3,388	576
Total	11,579	3,360	38,911
GRAND TOTAL	19,402	3,227	62,606

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 6. – *Area, yield, and production of garlic in Mexico, by States; 1943-44*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
Coahuila	329	1,480	487
Chihuahua	326	1,948	635
Durango	99	1,333	132
Nuevo León	608	1,719	1,045
San Luis Potosí	1,176	1,850	2,176
Tamaulipas	116	1,534	178
Zacatecas	175	1,354	237
Total	2,829	1,729	4,890
GULF:			
Tabasco	99	2,343	232
Veracruz	820	1,398	1,146
Total	919	1,499	1,378
PACIFIC NORTH:			
Baja California (T. Norte)	264	2,731	721
Baja California (T. Sur)	35	1,943	68
Nayarit	203	1,778	361
Sinaloa	309	1,880	581
Sonora	474	1,580	749
Total	1,285	1,930	2,480
PACIFIC SOUTH:			
Chiapas	198	1,525	302
Guerrero	84	1,262	106
Oaxaco	514	1,720	884
Total	796	1,623	1,292
CENTRAL:			
Aguascalientes	77	2,143	165
Distrito Federal	7	2,143	15
Guanajuato	2,488	1,806	4,493
Hidalgo	566	1,746	988
Jalisco	87	1,471	128
Mexico	64	2,281	146
Michoacán	450	1,880	846
Morelos	99	2,293	227
Puebla	983	1,942	1,909
Querétaro	284	2,088	593
Tlaxcala	119	1,445	172
Total	5,224	1,853	9,682
GRAND TOTAL	11,053	1,784	19,722

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 7. – *Area, yield, and production of melons in Mexico, by States, 1944-45*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
Coahuila	469	2,900	1,360
Chihuahua	376	3,106	1,168
Durango	264	4,292	1,133
Nuevo León	99	2,343	232
San Luis Potosí	111	4,072	452
Tamaulipas	250	3,228	807
Zacatecas	20	2,100	42
Total	1,589	3,269	5,194
GULF:			
Campeche	72	4,042	291
Tabasco	131	5,168	677
Veracruz	477	2,709	1,292
Yucatán	361	3,028	1,093
Total	1,041	3,221	3,353
PACIFIC NORTH:			
Baja California (T. Norte)	156	3,474	542
Baja California (T. Sur)	44	3,318	146
Nayarit	1,475	3,193	4,709
Sinaloa	734	3,608	2,648
Sonora	262	3,172	831
Total	2,671	3,323	8,876
PACIFIC SOUTH:			
Colima	30	3,167	95
Chiapas	388	3,613	1,402
Guerrero	538	3,983	2,143
Oaxaca	267	3,180	849
Total	1,223	3,670	4,489
CENTRAL:			
Aguascalientes	27	3,741	101
Guanajuato	1,606	3,582	5,752
Hidalgo	50	3,740	187
Jalisco	264	3,189	842
Mexico	12	2,583	31
Michoacán	222	3,495	776
Morelos	665	5,182	3,446
Puebla	361	3,102	1,120
Querétaro	99	2,808	278
Total	3,306	3,791	12,533
GRAND TOTAL	9,830	3,504	34,445

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 8. – *Area, yield, and production of watermelons in Mexico, by States, 1944-45*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
Coahuila	736	7,878	5,798
Chihuahua	588	4,684	2,754
Durango	905	4,463	4,039
Nuevo León	89	3,393	302
San Luis Potosí	208	5,308	1,104
Tamaulipas	264	3,659	966
Zacatecas	64	3,406	218
Total	2,854	5,319	15,181
GULF:			
Campeche	153	5,118	783
Tabasco	178	7,483	1,332
Veracruz	773	4,775	3,691
Yucatán	610	4,497	2,743
Total	1,714	4,988	8,549
PACIFIC NORTH:			
Baja California (T. Norte)	44	2,250	99
Baja California (T. Sur)	79	6,278	496
Nayarit	593	5,911	3,505
Sinaloa	806	6,108	4,923
Sonora	628	5,519	3,466
Total	2,150	5,809	12,489
PACIFIC SOUTH:			
Colima	84	5,952	500
Chiapas	608	4,271	2,597
Guerrero	1,078	4,405	4,749
Oaxaca	531	3,151	1,673
Total	2,301	4,137	9,519
CENTRAL:			
Aguascalientes	42	4,452	187
Guanajuato	682	4,457	3,040
Hidalgo	37	4,162	154
Jalisco	660	3,971	2,621
Mexico	57	5,070	289
Michoacán	534	4,719	2,520
Morelos	427	6,506	2,778
Puebla	287	4,561	1,309
Querétaro	49	4,633	227
Total	2,775	4,730	13,125
GRAND TOTAL	11,794	4,991	58,863

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 9. – *Area, yield, and production of eggplant in Mexico, by States, 1943-44*

ZONE AND STATE	AREA	YIELD PER ACRE	PRODUCTION
	Acres	*Pounds*	*1,000 pounds*
NORTH:			
San Luis Potosí	12	5,500	66
Zacatecas	3	6,000	18
Total	15	5,600	84
GULF:			
Tabasco	5	11,000	55
Veracruz	2	14,500	29
Yucatán	5	7,000	35
Total	12	9,917	119
PACIFIC NORTH:			
Sinaloa	74	11,622	860
Total	74	11,622	860
PACIFIC SOUTH:			
Oaxaca	25	4,840	121
Total	25	4,840	121
CENTRAL:			
Michoacán	7	6,857	48
Total	7	6,857	48
GRAND TOTAL	133	9,263	1,232

Source: *Dirección de Economía Rural.*

APPENDIX

TABLE 10. – *Methods of calculating production taxes on vegetables in the State of Sonora, Mexico*

I - 1 CAR OF TOMATOES CONTAINING 650 LUGS		Pesos
Production tax at 0.10 peso per lug		65.00
University of Sonora - 5 percent		3.25
Federal - 5 percent		3.45
Special sales tax of the State:	Pesos	
1 percent of 812.50 pesos	8.13	
5 percent for the University of Sonora	.41	
20 percent for roads	1.63	
5 percent Federal	.55	
Total sales tax		10.72
Drinking-water project for Huatabampo at 0.05 peso per lug		32.50
TOTAL		114.92

II - 1 CAR OF PEAS WITH 720 BASKETS		Pesos
Production tax at 0.15 peso per basket		108.00
University of Sonora - 5 percent		5.40
Federal - 5 percent		5.40
Special sales tax of the State:	Pesos	
1 percent of 900.00 pesos	9.00	
5 percent for the University of Sonora	.45	
20 percent for roads	1.80	
5 percent Federal	.70	
Total sales tax		11.95
Drinking-water project for Huatabampo at 0.05 peso per basket		36.00
TOTAL		166.75

NOTE: The tax is the same for peppers as for peas, except that the rate per container is applied to the total number of pepper containers in the car, usually from 400 to 450.

TABLE 11. – *Methods of calculating production taxes on vegetables in the State of Sinaloa, Mexico*

1 CAR OF TOMATOES CONTAINING 750 LUGS	Pesos
Production tax at 0.06 peso per lug	45.00
University of Sonora - 2 percent	.90
State - 10 percent additional	4.50
Municipality - 20 percent additional	9.00
Federal - 5 percent of all above-listed taxes	5.94
TOTAL	65.34

APPENDIX

COPY OF INSPECTION CERTIFICATE ISSUED BY THE UNITED STATES AGRICULTURAL MARKETING SERVICE, NOGALES, ARIZONA

F.P.I.-20a

UNITED STATES DEPARTMENT OF AGRICULTURE

INSPECTION CERTIFICATE

This certificate is issued in compliance with the regulations of the Secretary of Agriculture governing the inspection of various products pursuant to the Act making appropriations for the United States Department of Agriculture, and is admissible as prima facie evidence in all courts of the United States. This certificate does not excuse failure to comply with any of the regulatory laws enforced by the United States Department of Agriculture.

Inspection point.....Billing point.....Date.....

Applicant.....Address.....

Shipper.....Address.....

I, the undersigned, on the date above specified made personal inspection of samples believed by me to be representative of the lot of products herein described, and do hereby certify that the conditions, at the said time and on said date, pertaining to such products, as shown by said samples, were as stated below:

Car initial and number.....Kind of car.....

Car equipment and condition at completion of inspection.....
(Hour)

Products: TOMATOES: Applicant's count 780 lugs labeled "Bulank". Description of pack stamped. (See remarks)

Loading: Divided load, center braced, 5 wide, 6 high; layers stripped.

Pack: Mostly tight, some fairly tight; straight or straight bridge arrangements.

Size: Mostly fairly uniform, some irregular.

Quality and condition:
Tomatoes approximately 91% mature green, 9% turning; generally firm, mostly smooth and well formed, many fairly smooth and fairly well formed. Defects range from 12% to 16%, averaging 15%, consisting of 11% puffy, 2% bruises, remainder mostly scars or soil stain.

Grade: Approximately 85% U. S. NO. 1 Quality. Meets Canadian Import Requirements.

Remarks: Inspection restricted to top layer of load.

.....
Inspector

Please refer to this certificate by number.

8--6645a

APPENDIX

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F.P.I.-20a

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Inspection point.....Billing point.....Date.....

Applicant.....Address.....

Shipper.....Address.....

I, the undersigned, on the date above specified made personal inspection of samples believed by me to be representative of the lot of products herein described, and do hereby certify that the conditions, at the said time and on said date, pertaining to such products, as shown by said samples, were as stated below:

Car initial and number.....Kind of car.....

Car equipment and condition at completion of inspection.....
(Hour)

Products: SWEET PEPPERS: Applicant's count 470 paper lined crates, labeled "El Realito". (See remarks)

Loading: Through load, 6 wide, 6 high; layers stripped.

Pack: Crates generally level full, few 1 inch slack filled.

Size: Generally ranging from 2 to 3-3/4 inches in length, and from 2 to 3-1/2 inches in diameter.

Quality and condition:

Peppers mature green, mostly fresh, firm and well shaped, some fairly well shaped. Defects range from 16% to 40%, averaging approximately 28%, consisting of 12% shriveling, 7% bruises, remainder mostly virus mottling, or mechanical injury and including in many crates 4% decay, in most crates none, averaging 2% for lot.

Grade: Averages approximately 70% U. S. NO. 1 Quality, (2 inch minimum).

Remarks: Inspection restricted to top layer of load.

.....
Inspector

V.B. Please refer to this certificate by number.

8--6645a U. S. Government Printing Office: 1930

APPENDIX

COPY OF INSPECTION CERTIFICATE ISSUED BY THE UNITED STATES AGRICULTURAL MARKETING SERVICE, NOGALES, ARIZONA

F.P.I.-20a

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Inspection point.....Billing point.....Date.....

Applicant.....Address.....

Shipper.....Address.....

I, the undersigned, on the date above specified made personal inspection of samples believed by me to be representative of the lot of products herein described, and do hereby certify that the conditions, at the said time and on said date, pertaining to such products, as shown by said samples, were as stated below:

Car initial and number.....Kind of car.....

Car equipment and condition at completion of inspection.....
(Hour)

Products: FRESH PEAS: Applicant's count 720 bushel size tubs labeled "Choice". (See remarks)

Loading: Through load, 6 wide, 5 high; crushed top ice.

Pack: Tubs generally well filled.

Size: Pods generally range from 3-1/2 to 5, mostly 4 to 4-1/2 inches in length.

Quality and condition:
Peas generally fresh, tender and firm. Pods generally good green color; mostly well, some fairly well filled. Defects range from 8% to 32%, averaging approximately 16%, consisting of 8% freezing injury, 2% worm injury, remainder mostly overmature or thrip scars. No decay.

Grade: Averages approximately 85% U. S. NO. 1 Quality.

Remarks: Inspection restricted to tubs loaded in top layer, in space between doors, and one stack each side of doorways of car.

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Inspector

Please refer to this certificate by number.

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